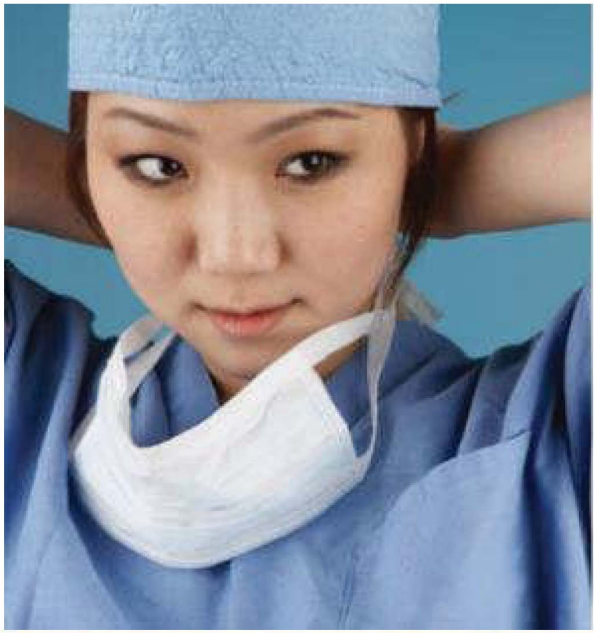
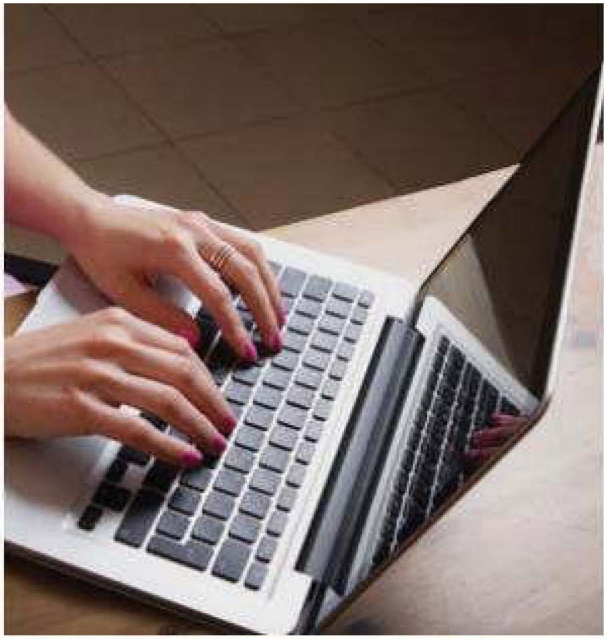
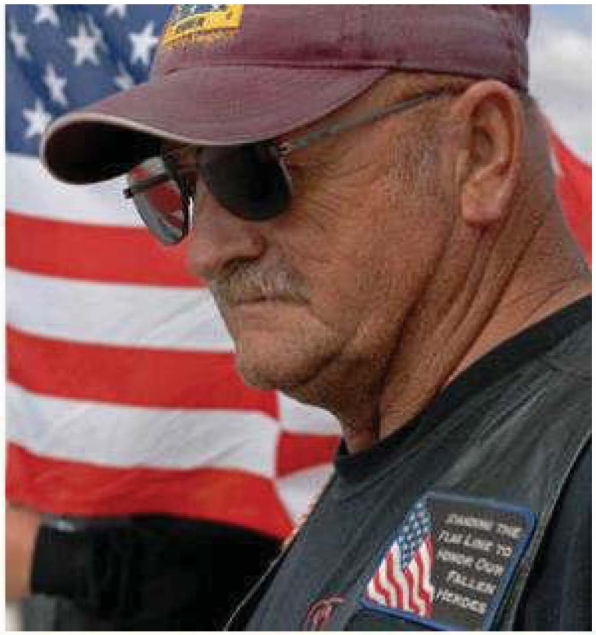

Office of Public Health

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

Victoria Davey, Ph.D., M.P.H.
Chief Public Health Officer

VA HEALTH CARE | Defining EXCELLENCE in the 21st Century

April 28, 2014

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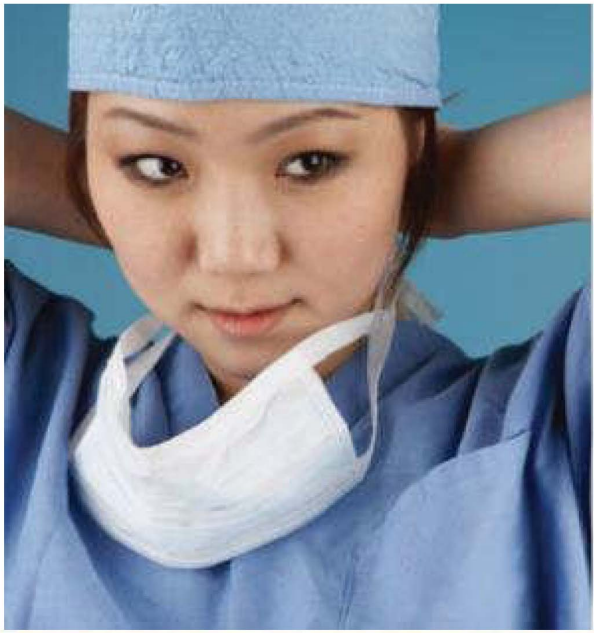
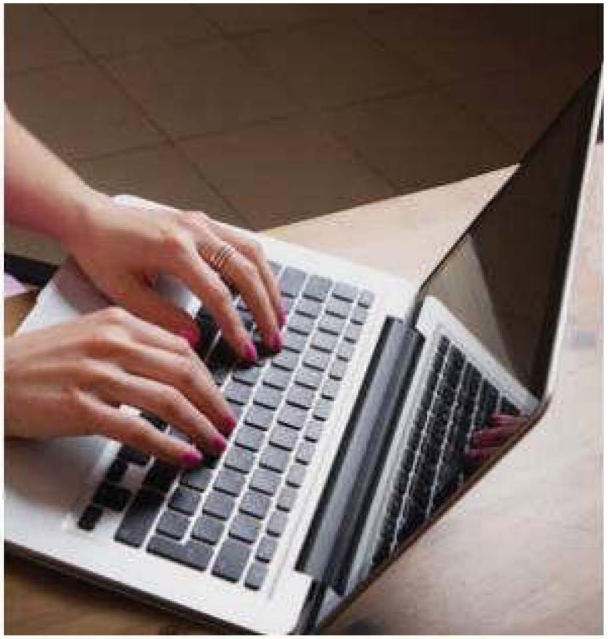
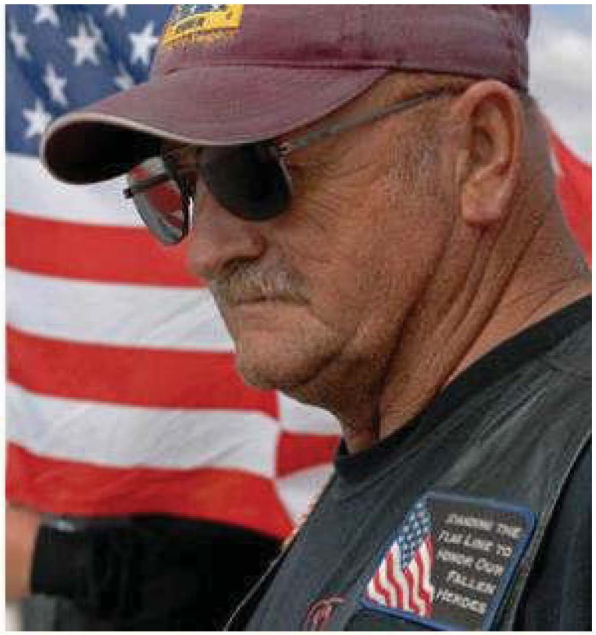

Follow Up Studies:

National Cohort of Gulf War and Gulf Era Veterans
National Health Study of a New Generation of Veterans

Robert Bossarte, Ph.D.

Director, Epidemiology Program, Post-Deployment Health

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What is Epidemiology?

- Epidemiology is the study of the distribution and determinants of health related states or events and the application of this study to the control of diseases and other health problems.

- Various methods can be used in epidemiologic studies including surveillance and descriptive investigations used to study distribution of morbidity and mortality and analytic studies used to identify correlates of discrete outcomes.

- OPH's Epidemiology Program conducts descriptive, observational and analytic studies of cohorts defined by period of service.
  - These studies contribute evidence to support and inform policy development.

VA's Initial Survey of Gulf War Veterans

- Initiated in 1992 in response to concerns that Gulf War Veterans were experiencing a variety of symptoms and concern about environmental exposures.
- Objective: To establish a baseline of exposure, health status and service utilization and describe changes in health among Gulf War Veterans.
- Topic areas included:
  - physical and mental health;
  - physical and social functioning.
- One of a collection of studies conducted by the VA, Department of Defense, and Health and Human Services.
- Largest longitudinal study of Gulf War and Gulf Era-Veterans.

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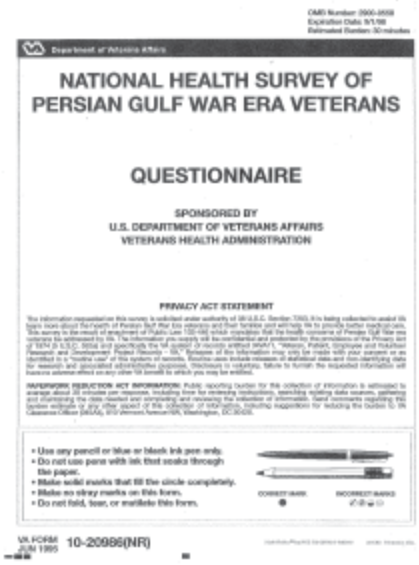
Gulf War Studies

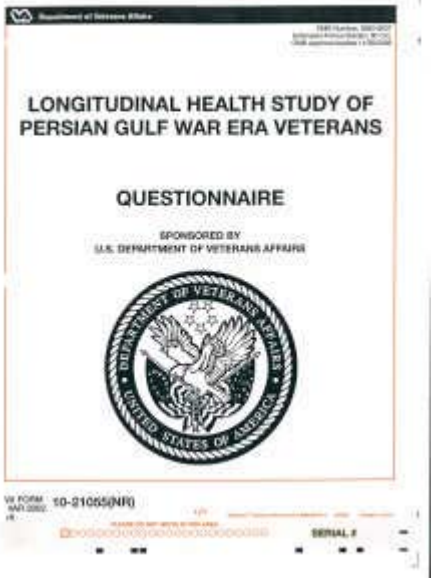

NATIONAL HEALTH SURVEY OF PERSIAN GULF WAR ERA VETERANS

QUESTIONNAIRE

SPONSORED BY
U.S. DEPARTMENT OF VETERANS AFFAIRS
VETERANS HEALTH ADMINISTRATION

PRIVACY ACT STATEMENT

VA FORM 10-20986(NR)


LONGITUDINAL HEALTH STUDY OF PERSIAN GULF WAR ERA VETERANS

QUESTIONNAIRE

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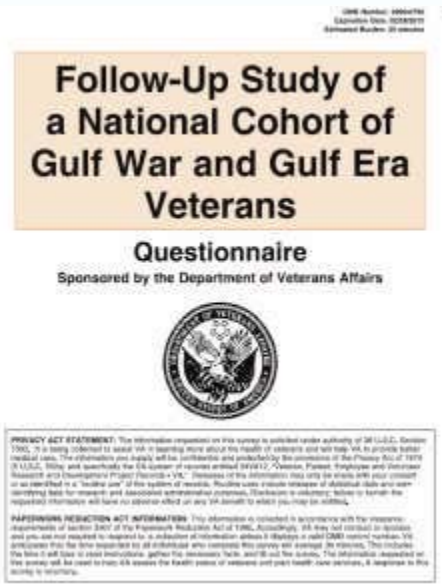
Follow-Up Study of a National Cohort of Gulf War and Gulf Era Veterans

Questionnaire

Sponsored by the Department of Veterans Affairs

PRIVACY ACT STATEMENT:

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Survey Methodology

- Population based sample of 15,000 GW deployed Veterans and 15,000 GW non-deployed Veterans.
- Sampled from population of 696,000 deployed Veterans and 803,000 non-deployed Veterans.
- Oversampled Women, National Guard and Reserve.

Distribution of Veterans by Gender and Unit Component

Unit Component	Gender		
	Male	Female	Total
Active	4,800	1,200	6,000
Reserve	4,000	1,000	5,000
National Guard	3,200	800	4,000
Total	**12,000**	**3,000**	**15,000**

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Summary of Findings: Wave 1 & Wave 2

Wave 1

- Deployed Veterans reported higher prevalence of:
  - Serious chronic health conditions;
  - Lower perception of general health;
  - Functional impairment;
  - Health care utilization;
  - Miscarriage (Female Veterans and female partners of male Veterans);
  - Birth defects among live born infants (Female Veterans and female partners of male Veterans).

Kang et al, 2000 (JOEM); Kang et al, (2001)

Wave 2

- Deployed Veterans continued to report significantly higher rates of adverse health outcomes including:
  - Unexplained multi-symptom illness;
  - Chronic fatigue-like illness;
  - PTSD;
  - Functional impairment;
  - Health care utilization;
  - Physical and mental health conditions.

Kang et al, 2009 (JOEM); Li et al, 2009 (AJE)

Main Finding: Veterans deployed in support of Operation Desert Shield and Desert Storm consistently report higher prevalence of adverse health outcomes.

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Gulf War Study – Wave 3 (2012 - 2013) Topics of Inquiry

- General health
- Chronic multi-symptom illness (CMI)
- Cancers
- Liver dysfunction
- GI disturbance
- Endocrine disorders
- Autoimmune conditions
- Neurological conditions
- Amyotrophic lateral sclerosis (ALS)
- Functional health
- Post Traumatic Stress Disorder (PTSD)
- Exercise
- Alcohol use
- Tobacco Use
- Complementary and alternative medicine (CAM)
- Women's heath
- Health care utilization
- Medication use

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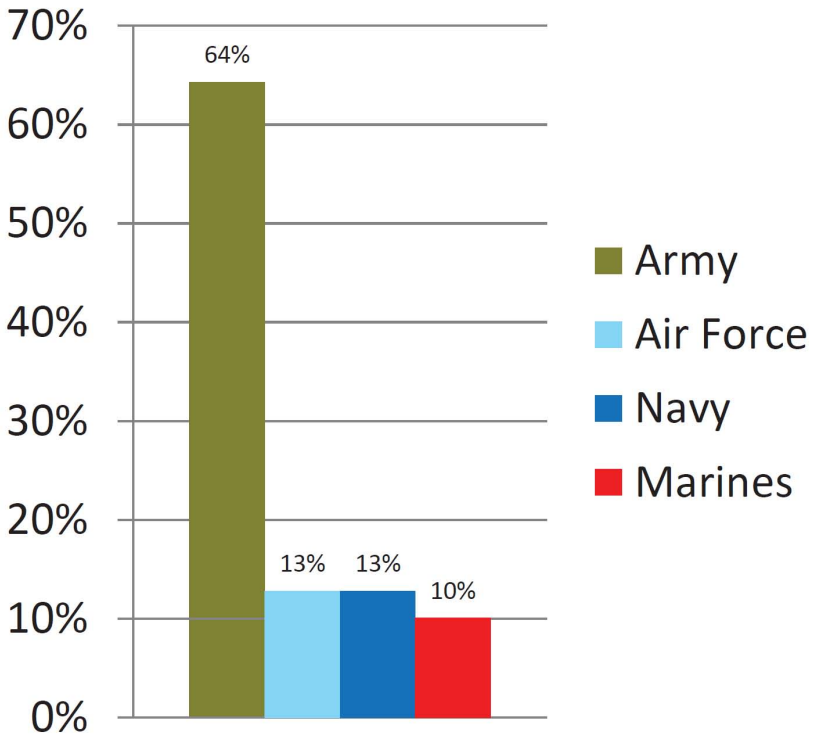
Gulf War Study (Wave 3) Response Rates & Participant Characteristics

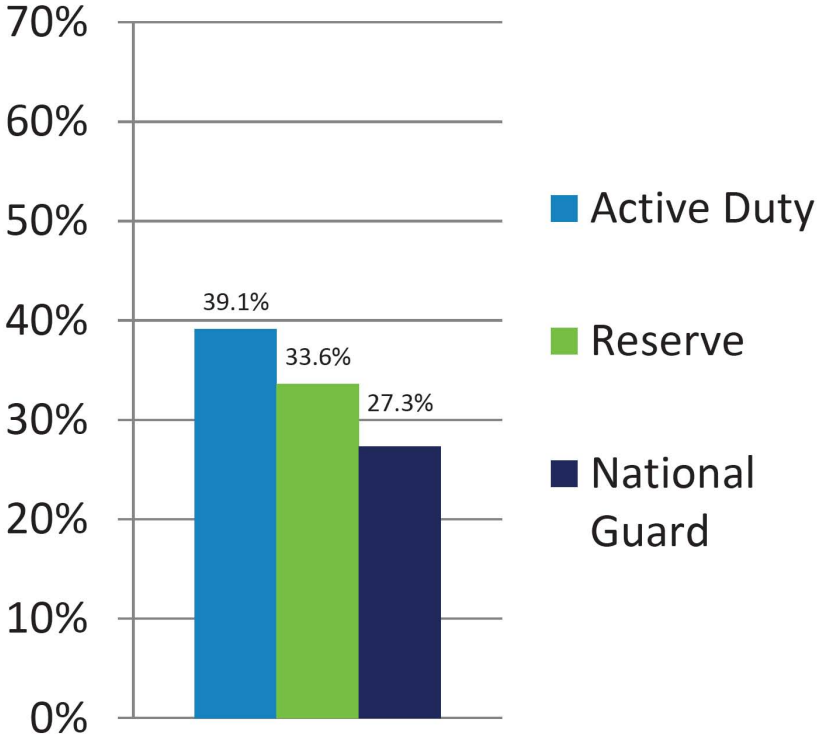
- 50% response rate (n=14,252)
  - 68% (n=9,643) responded by mail survey
  - 26% (n=3,808) responded by Web
  - 6% (n=801) responded by CATI
- Gender
  - 79.7% were male
  - 20.3% were female
- Deployment status
  - 56.9% were deployed
  - 43.1% were not deployed

Gulf War Study – Wave 3, Participant Service Characteristics

Branch of Service



Service Component



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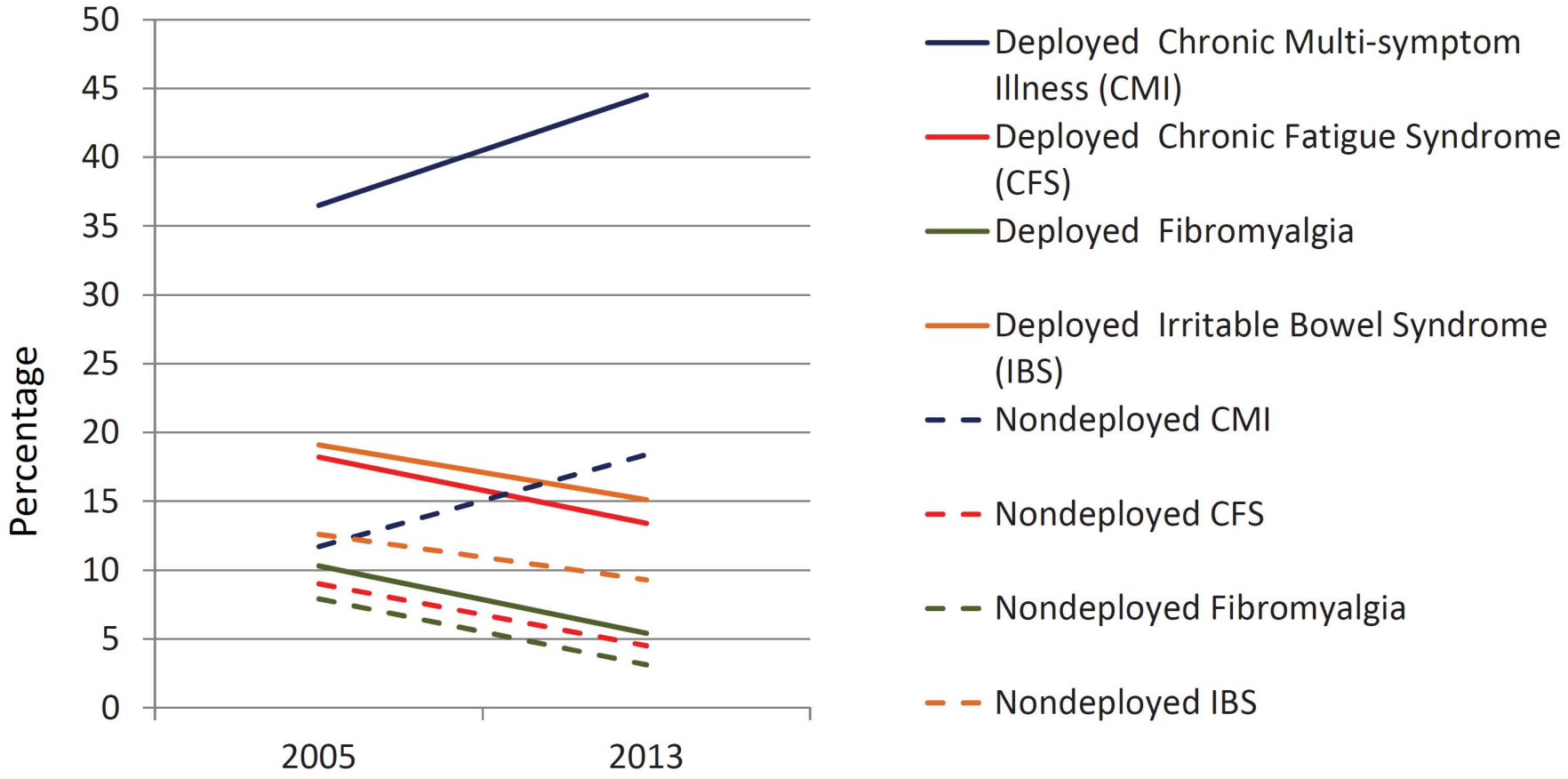
Estimated Prevalence of Self-Reported Health Conditions among Gulf War Veterans (Waves 2 & 3)



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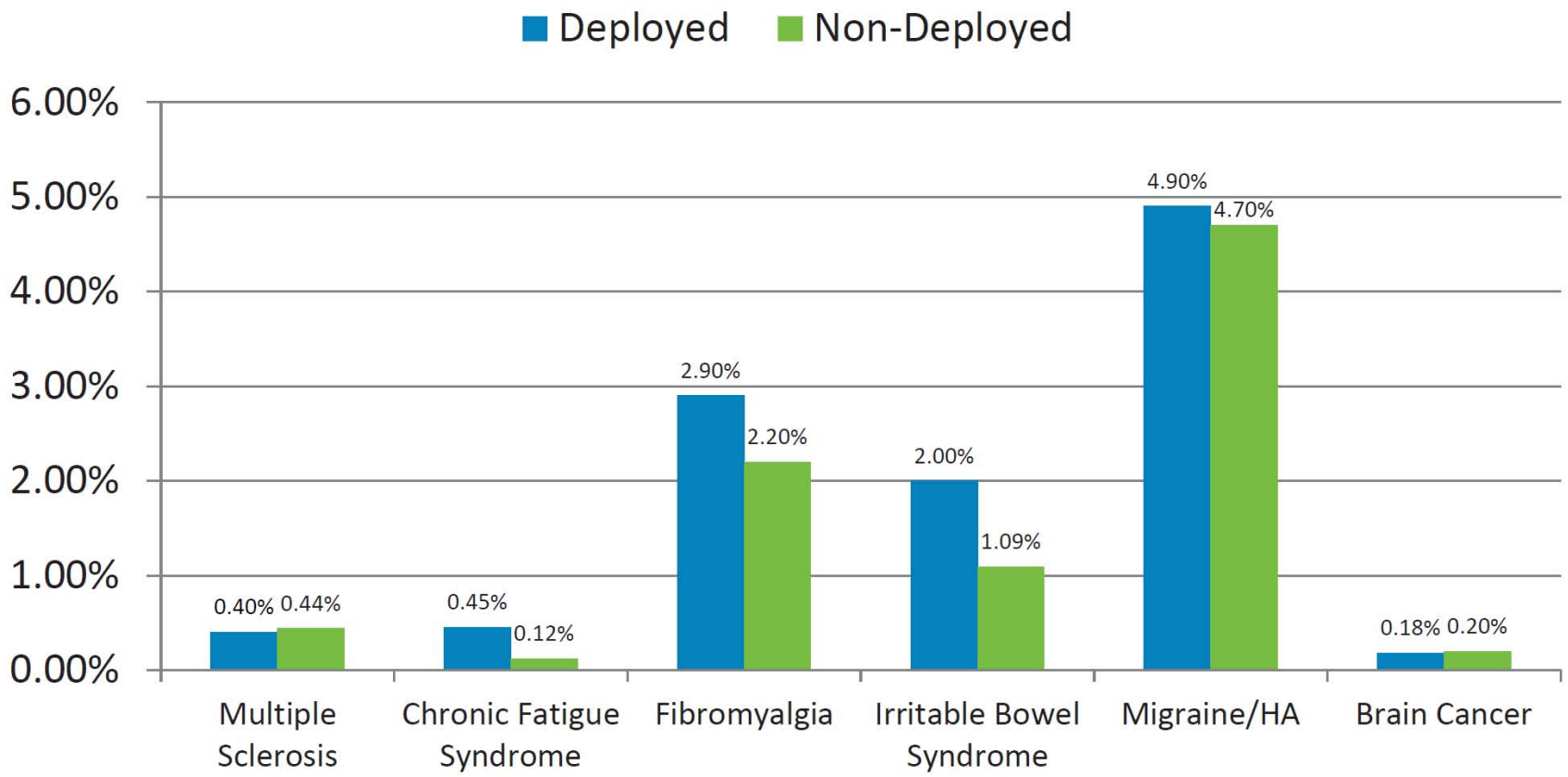
Main Finding: Deployed Veterans continue to report higher prevalence of adverse health outcomes.

Prevalence of Select Diagnoses among Gulf War Veterans with History of VHA Service Use, FY13



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Main Finding: Deployed Veterans who use VHA health services have higher prevalence of selected diagnoses.

Impact of Gulf War Studies to Date

- Publications
  - 18 publications based on findings from the cohort surveys /clinical studies with cohort
  - 31 additional studies or papers on Gulf War Veterans
- Related Studies
  - Cooperative Studies Program 458: National Health Survey of Gulf War Era Veterans and Their Families (examination study)
  - Li et al: Self-reported post-exertional fatigue in Gulf War Veterans: roles of autonomic testing
  - Wallin et al: Neuropsychologic assessment of a population-based sample of Gulf War veterans
- Policies
  - Care to Priority 6 Veterans
- Presumptions informed by OPH studies
  - Findings supported presumptions for “chronic multi-symptom illness” and “undiagnosed illnesses”

Mortality among Gulf War Veterans (1991-2011)

- Cohort consisting of 621,902 Gulf War Veterans who served in the Persian Gulf during the time of armed conflict from August 1, 1990. – March 1, 1991 and 746,248 control group Veterans who served during the Gulf War but were not deployed to theater.
- For GW deployed Veterans, vital status follow-up began the year they left theater.
- For non-deployed GW Veterans follow-up began on May 1, 1991.
- Follow-up ended at date of death or December 31, 2011.
- Information on cause of death was obtained from the National Death Index and analyzed using the CDC National Institute for Occupational Safety and Health Life Table Analysis System (LTAS).

Leading Causes of Death in the U.S.– 2010

All Ages

1. Diseases of heart
2. Malignant neoplasms
3. Chronic lower respiratory diseases
4. Cerebrovascular diseases
5. Accidents (unintentional injuries)
6. Alzheimer's disease
7. Diabetes mellitus
8. Nephritis, nephrotic syndrome, and nephrosis
9. Influenza and pneumonia
10. Intentional self-harm (suicide)

Males, 35-44 Years

1. Accidents (unintentional injuries)
2. Diseases of heart
3. Malignant neoplasms
4. Intentional self-harm (suicide)
5. Assault (homicide)
6. Chronic liver disease and cirrhosis
7. Human immunodeficiency virus (HIV) disease
8. Diabetes mellitus
9. Cerebrovascular diseases
10. Influenza and pneumonia

Source: Heron M. Deaths: Leading causes for 2010. National vital statistics reports; vol 62 no 6. Hyattsville, MD: National Center for Health Statistics. 2013.

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Leading Causes of Death among Gulf War Veterans – 1991-2011

Deployed (Total Deaths n=21,144)

1. Malignant neoplasms
2. Heart diseases
3. Transportation injuries
4. Intentional self-harm
5. Other injury (major)
6. Other and unspecified causes
7. Assault and homicide
8. Other diseases of the circulatory system
9. Diseases of the digestive system
10. Diseases of the respiratory system

Non-Deployed (Total Deaths n=29,340)

1. Malignant neoplasms
2. Heart diseases
3. Transportation injuries
4. Intentional self-harm
5. Other injury (major)
6. Other diseases of the circulatory system
7. Other and unspecified causes
8. Diseases of the digestive system
9. Assault and homicide
10. Diseases of the respiratory system

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Main Finding: Leading causes of death among Gulf War Veterans are different than observed in the U.S. general population.

Relative Risk for Select Causes of Death among Gulf War Veterans – 1991-2011*

SMR < 1 = ↓ risk

Deployed (N=621,901)

Cause	N	Standardized Mortality Ratio	Confidence Intervals
All Cause	21,144	0.53	0.52, 0.53
Lung Cancer	1,082	0.60	0.57, 0.64
MS	31	0.47	0.32, 0.66
Brain Cancer	307	0.88	0.78, 0.98
Suicide	2,471	0.91	0.88, 0.95
MVC - Driver	1,237	0.97	0.91, 1.02

Non-Deployed (N=746,247)

Cause	N	Standardized Mortality Ratio	Confidence Intervals
All Cause	0.54	0.54	0.53, 0.54
Lung Cancer	1,868	0.59	0.56, 0.62
MS	49	0.48	0.36, 0.64
Brain Cancer	462	0.93	0.85, 1.02
Suicide	2, 831	0.91	0.88, 0.95
MVC - Driver	1,247	0.88	0.83, 0.93

*Reference population: Mortality among U.S. Population, 1960-2009

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Main Finding: Overall, Gulf War Veterans have lower relative risk for select causes of death when compared to the U.S. general population.

Understanding Health Outcomes among Gulf War Veterans with Continued Service

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National Health Study for a New Generation of Veterans (2012-2013)

- Population based cohort study of 30,000 OEF/OIF Veterans and 30,000 OEF/OIF-era Veterans.
- Survey included questions about:
  - Health status;
  - Doctor diagnosed conditions;
  - Smoking and alcohol behaviors;
  - Traumatic brain injury;
  - Mental health disorders;
  - Risky driving behaviors;
  - Risky sexual behavior;
  - Reproductive health/Infertility;
  - Complementary and alternative medicine use;
  - Military sexual trauma;
  - Environmental exposures;
  - Combat exposure.

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Gulf War Veterans Participating in the National Health Study of a New Generation of Veterans

- New Generation panel members with Gulf War service
  - 3,049 GW Deployed* Veterans in the New Gen Panel
  - 3,329 GW Non-Deployed* Veterans in the New Gen Panel

- New Generation respondents with Gulf War Service
  - 1,466 GW Deployed* Veterans with a completed New Gen Survey
  - 1,605 GW Non-Deployed* Veterans with a completed New Gen Survey

*Deployment status determined by service during Gulf War

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Research Strategy

- Completed studies
  - Respiratory conditions/functioning (Barth et al, 2014, Mil Med)
  - PTSD and deployment status (Dursa, et al, under review)
  - Infertility (Katon et al, 2014, Women's Health)
  - Use of Complementary and Alternative Modalities (under review)
- Existing/planned analyses
  - Prevalence of health conditions and functional status
  - Respiratory disease and associated risk factors
  - Prevalence of health risk behaviors (tobacco and alcohol use)
  - Self reported risky driving behaviors
  - Military sexual trauma
  - Self-reported pregnancy outcomes

Protecting the Safety of VA Study Participants

- VA is uniquely positioned to conduct studies of physical and mental health.
- In addition to scientific expertise, VA has the capacity to link study participants with services in response to recognized need.
- In addition, VA resources and data systems provide information necessary to understand outcomes and identify opportunities for enhancement to existing protocols.
- Recently, OPH conducted an assessment of outcomes among survey respondents who reported thoughts of death or self-harm as part of an established measure of depressive symptomology. Outcome measures included:
  - Mortality including death by suicide;
  - Use of VHA services;
  - History of mental health diagnoses;
  - Use of the Veterans Crisis Line;
  - History of suicide attempt as reported in VA's Suicide Prevention Application Network (SPAN).

Outcomes among New Generation Study Participants Reporting Thoughts of Death

- 1,942 New Generation study participants reported thoughts of death or self-harm in the two weeks prior to study participation. Among those reporting any thoughts of death or self-harm:
  - 56.3% had a history of VHA service use in FY 2010 or FY2011;
    - 38.9% had one or more mental health diagnoses;
    - 37.2 % had one or more mental health outpatient encounters;
    - 3.9% had one or more psychiatric inpatient or residential stays.
  - Among those with VHA service use the most common mental health diagnoses were:
    - PTSD (25.6%)
    - Dysthymia (i.e. - mild, long-term depression) (23.3%)
    - Major Depression (13.6%)
    - Anxiety (13.4%)

Main Finding: Approximately 50% of New Gen study participants reporting thoughts of death had history of VHA service use.

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Outcomes among New Generation Study Participants Reporting Thoughts of Death, Continued

- All survey participants were provided information on the toll-free Veterans Crisis Line (VCL).
- 3.7% of the 1,942 who reported thoughts of death or self-harm called the VCL and provided identifying information.
- In total, 71 study participants called the VCL 153 times and provided identifying information.
- No record of rescues or other emergency intervention among study participants who could be identified.

Main Finding: New Gen study participants who were provided with information on the Veterans Crisis Line used this resource.

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Outcomes among New Generation Study Participants Reporting Thoughts of Death, Continued

- 31 non-fatal suicide attempts through among study participants reporting thoughts of death.
- 12 deaths from any cause, including 2 deaths from suicide among study participants reporting thoughts of death.
  - The interval between survey completion and death from suicide was more than 7 months
  - A review of survey responses provided by the two suicide decedents identified multiple factors associated with increased risk for suicide:
    - Symptoms of depression, PTSD and traumatic brain injury;
    - Positive screens for anxiety and heavy episodic drinking and serious conflicts with family/friends.
- Rates for non-fatal attempts and suicides among New Generation participants endorsing thoughts of death were substantially lower than those reported in a recently published study (Simon et al, 2013).
  - 2,000/100,0000 (Simon et. al.) vs 1,596/100,000 (New Gen) for non-fatal attempts.
  - 148/100,000 (Simon et. al.) vs 103/100,000 (New Gen) for deaths from suicide.

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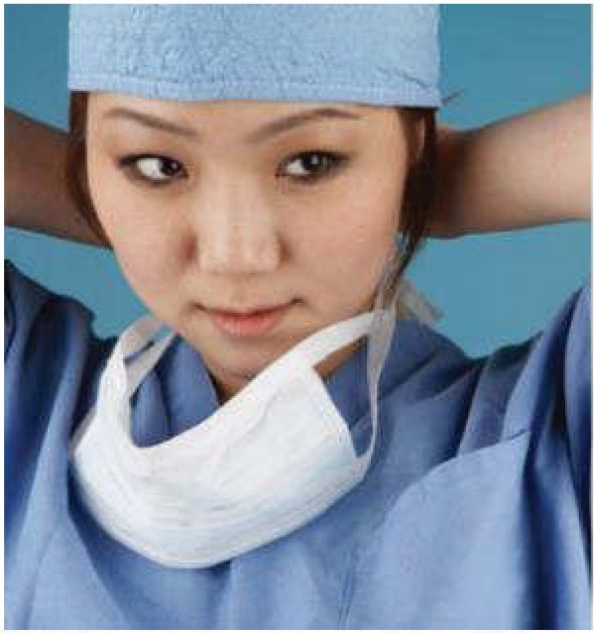
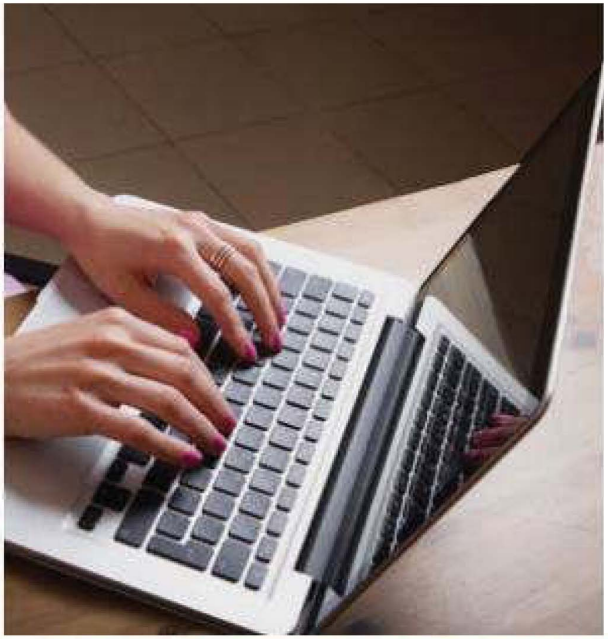
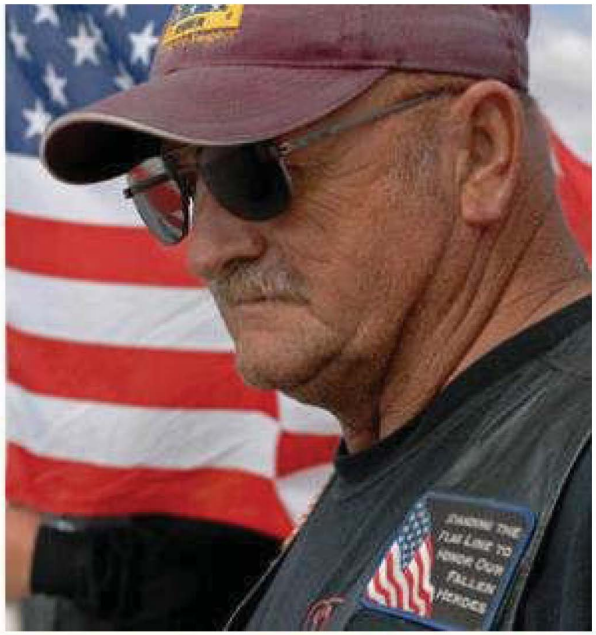
Main Finding: New Gen study participants who endorsed thoughts of death had lower rates of suicide and suicide attempt than those reported in a previous study.

The Gulf War Era: Multiple Sclerosis Cohort

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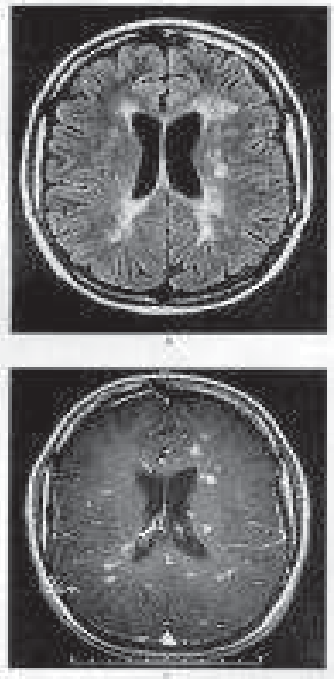
Multiple Sclerosis

- Inflammatory demyelinating disease of the central nervous system
- The most common progressive neurologic disease of young adults (mean age of onset: 30 yrs)
- Risk Factors:
  - Female sex
  - White race
  - Northern latitude
  - High socioeconomic status
  - Scandinavian ancestry

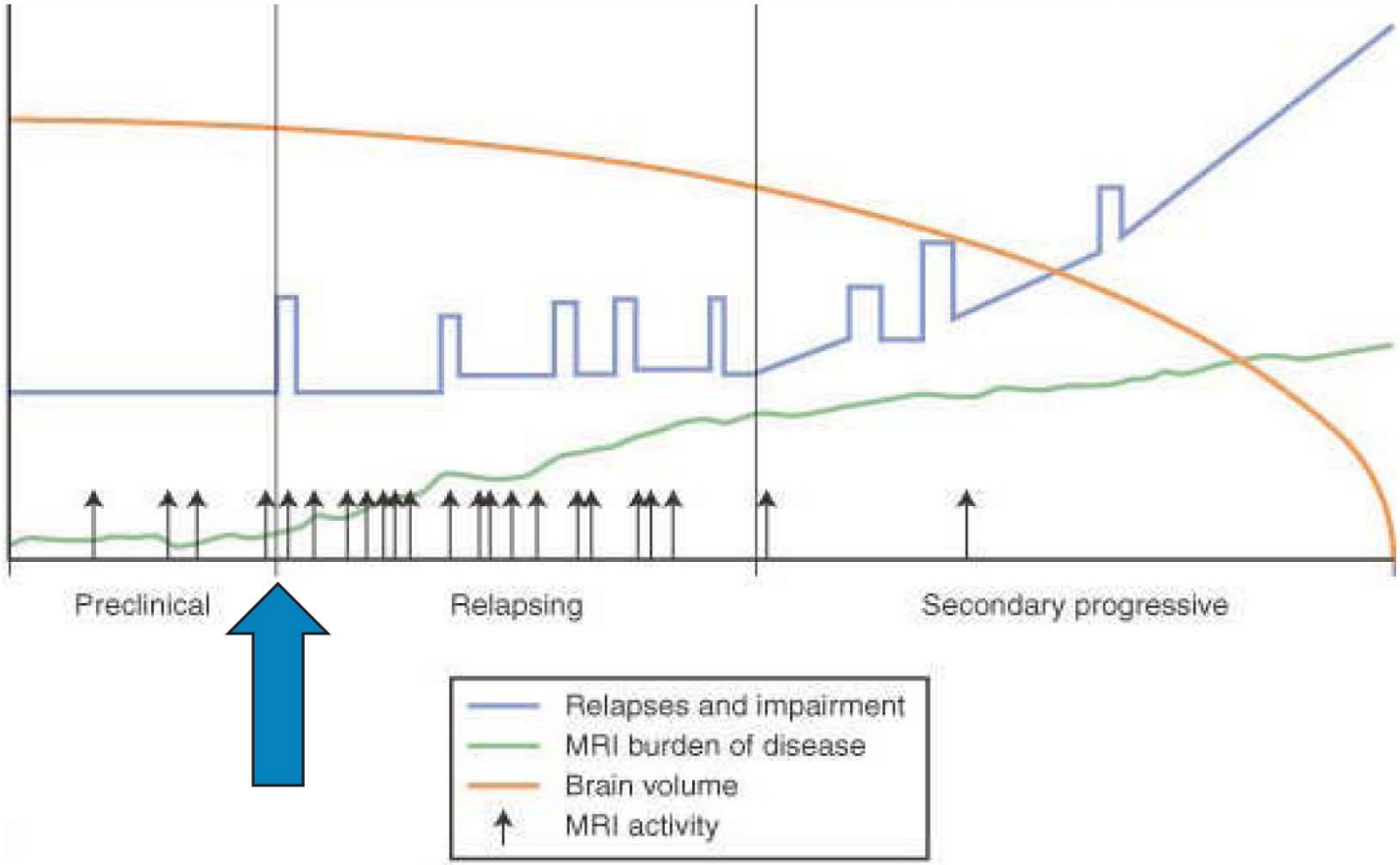
Axial Brain MRI



Noseworthy *NEJM* , 2000

MS Disease Morbidity Timeline

(Lublin F, *Neurol in Clin Pract*, 2008)



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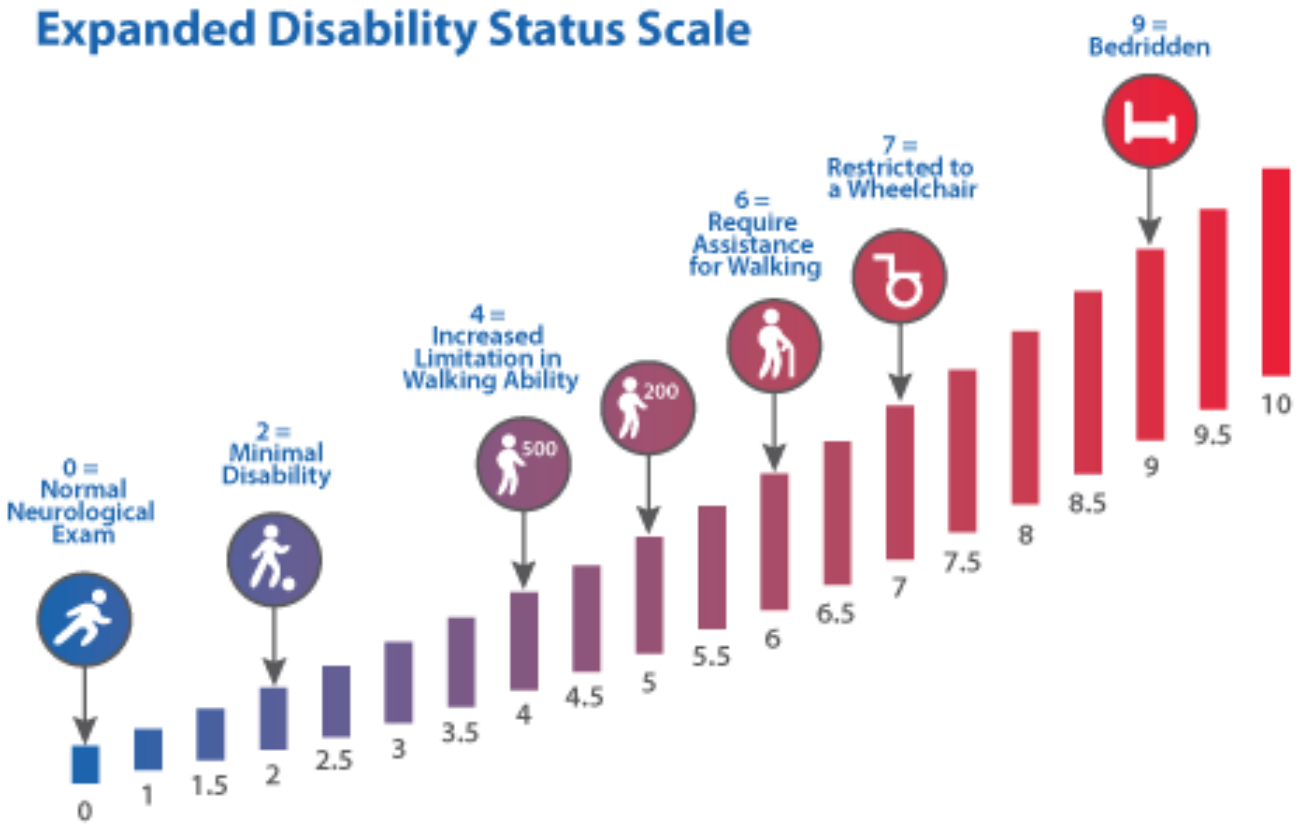
Kurtzke Expanded Disability Status Scale (EDSS) (Kurtzke J. Neurology 1983)



Adapted from: Kurtzke JF. Neurology. 1983;33:1444-1452.

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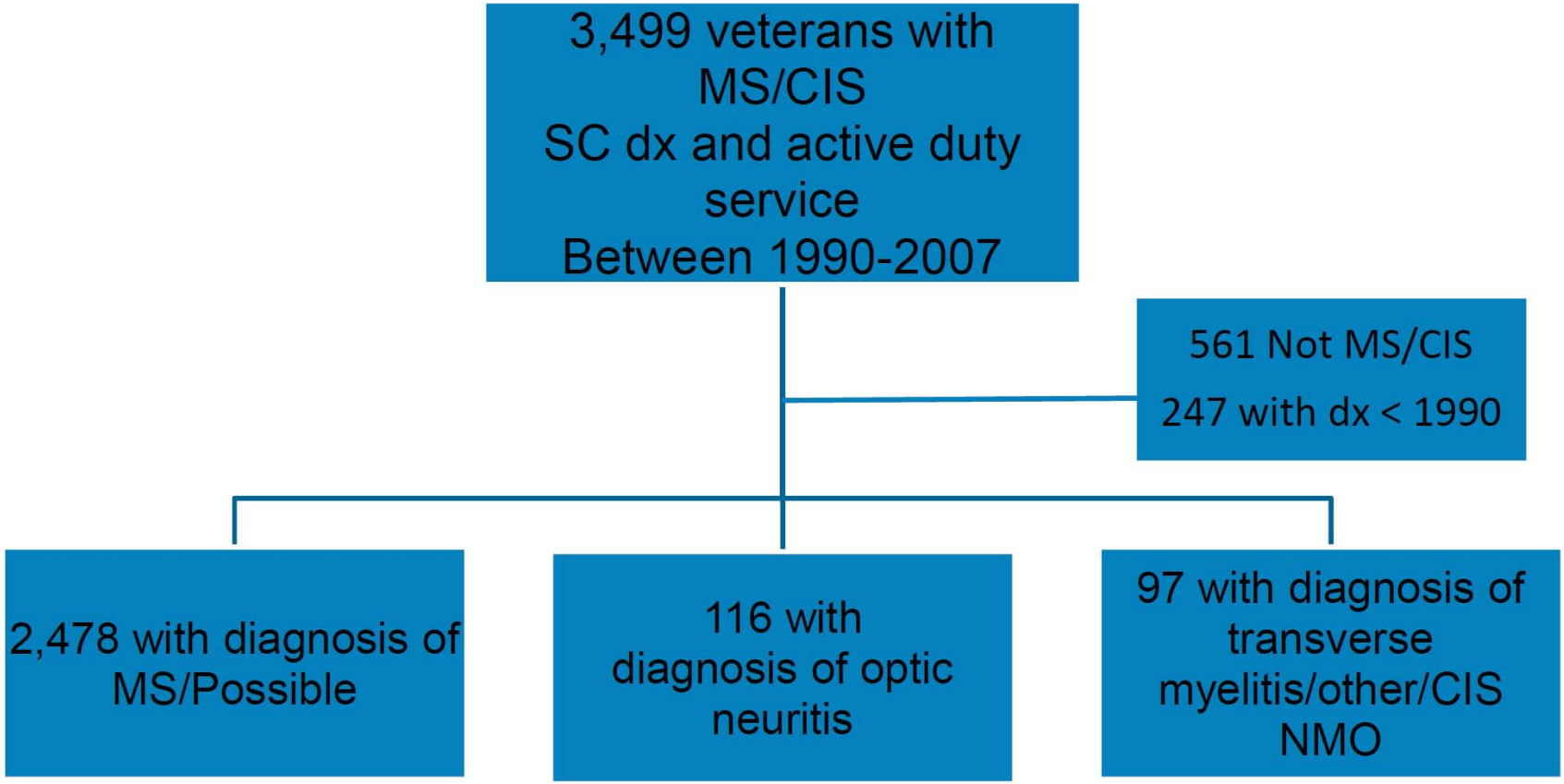
MS in Gulf War-era Veterans Study Cohort (n=2,691)



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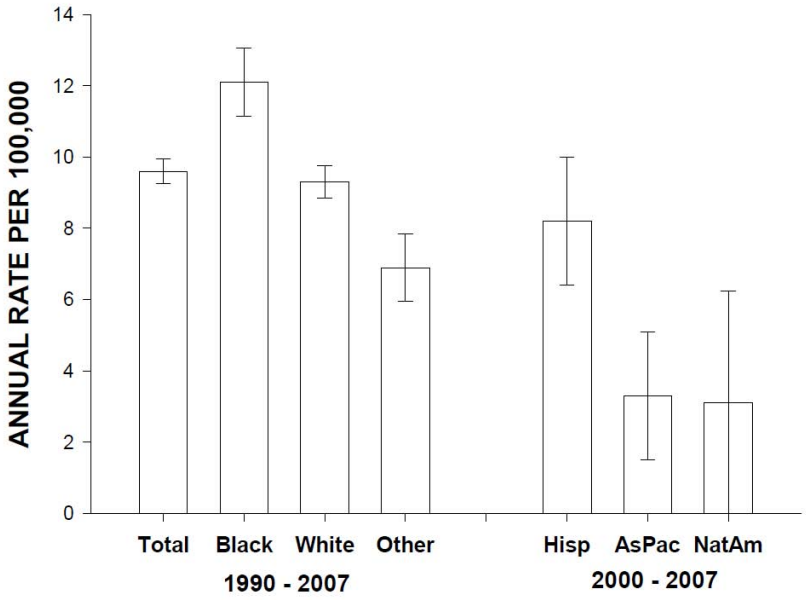
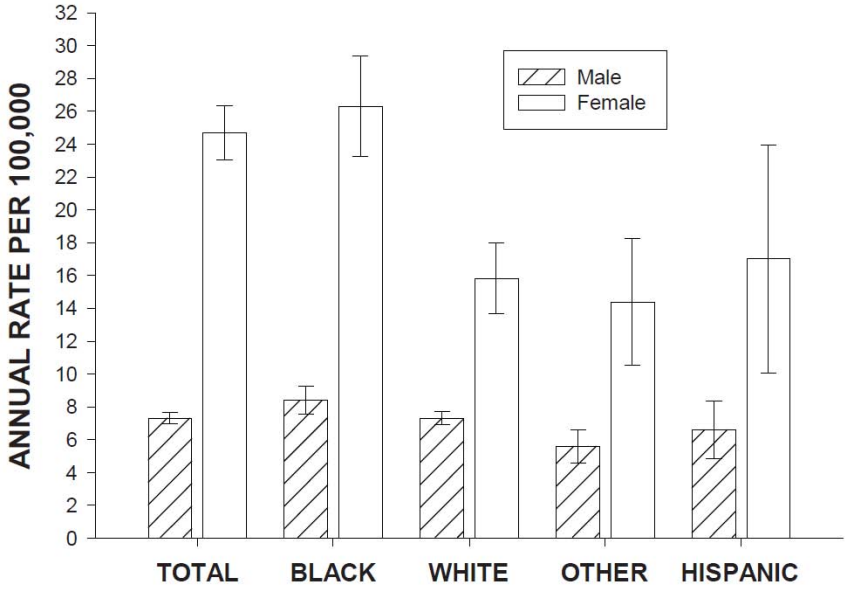
GW MS Cohort: Average Annual MS Incidence Rates (Wallin, et al Brain 2012)





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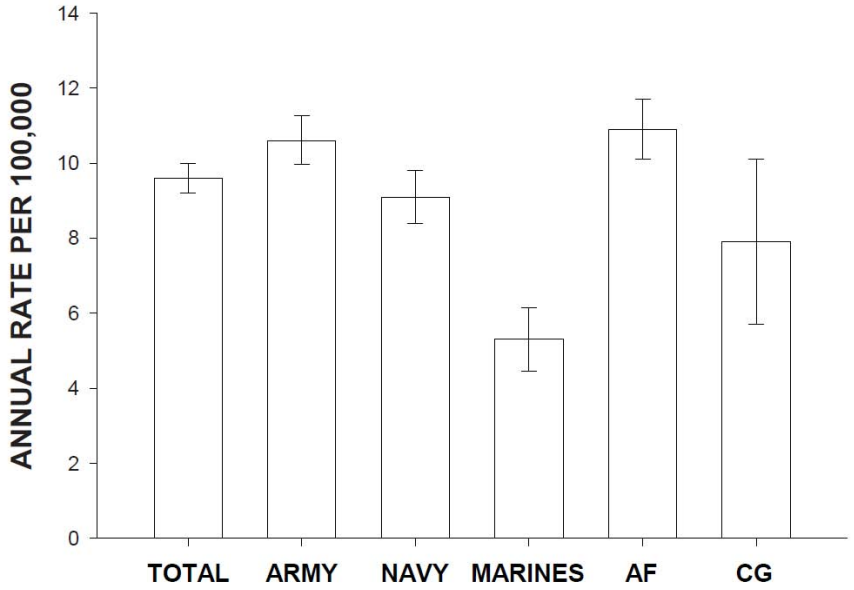

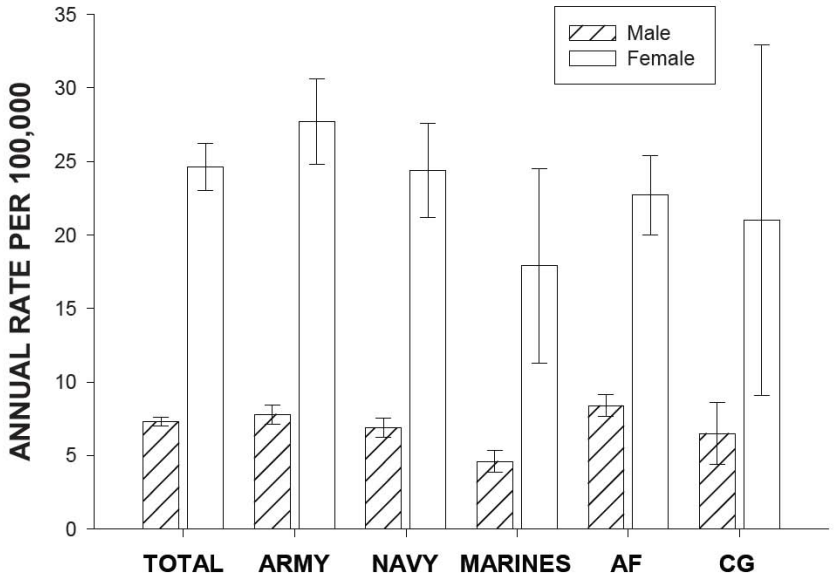

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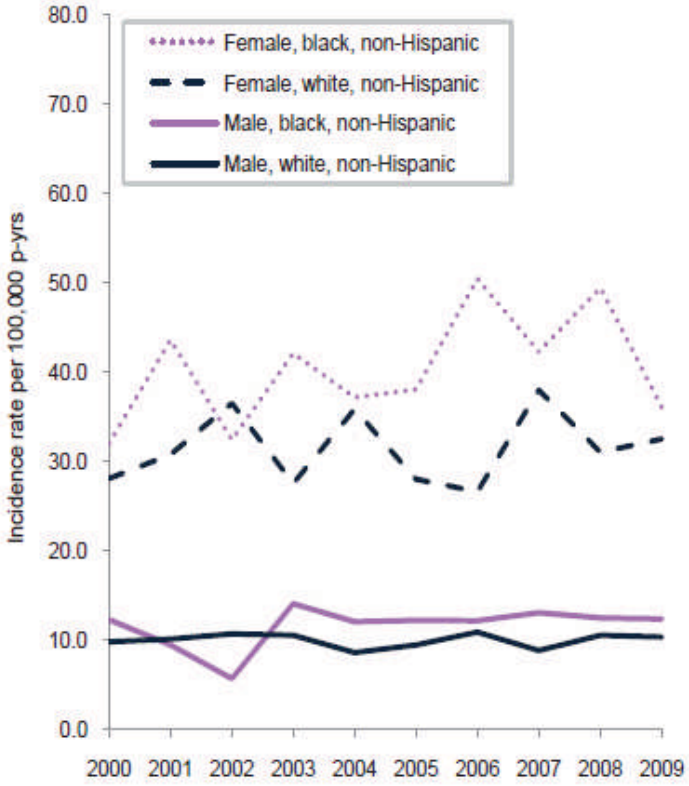
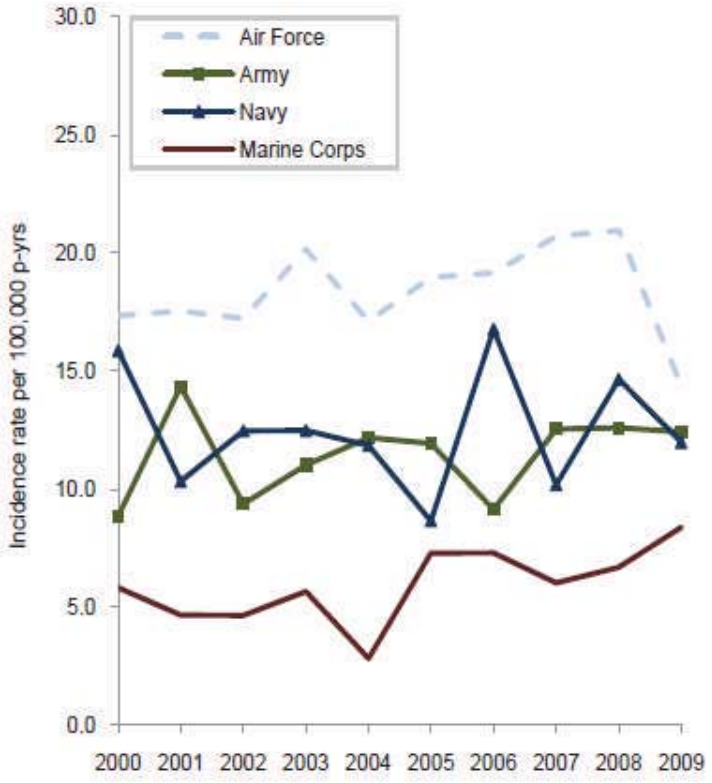
MS Incidence in Active Component, US Armed Forces 2000-2009 (Duessing, et al 2011 & 2012)





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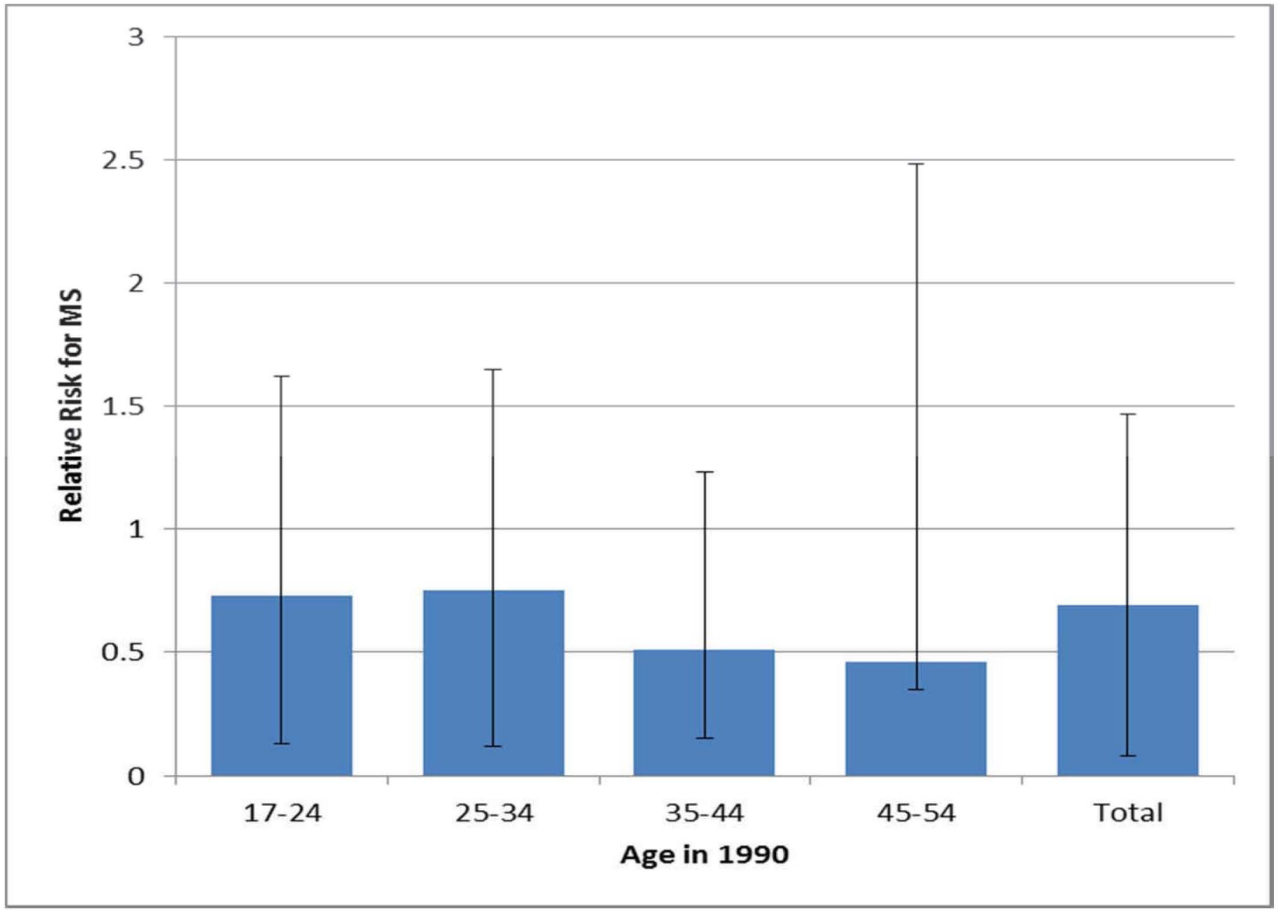
Relative Risk for MS Based on GW1 Deployment (Wallin, et al Neuroepidemiology, in press)



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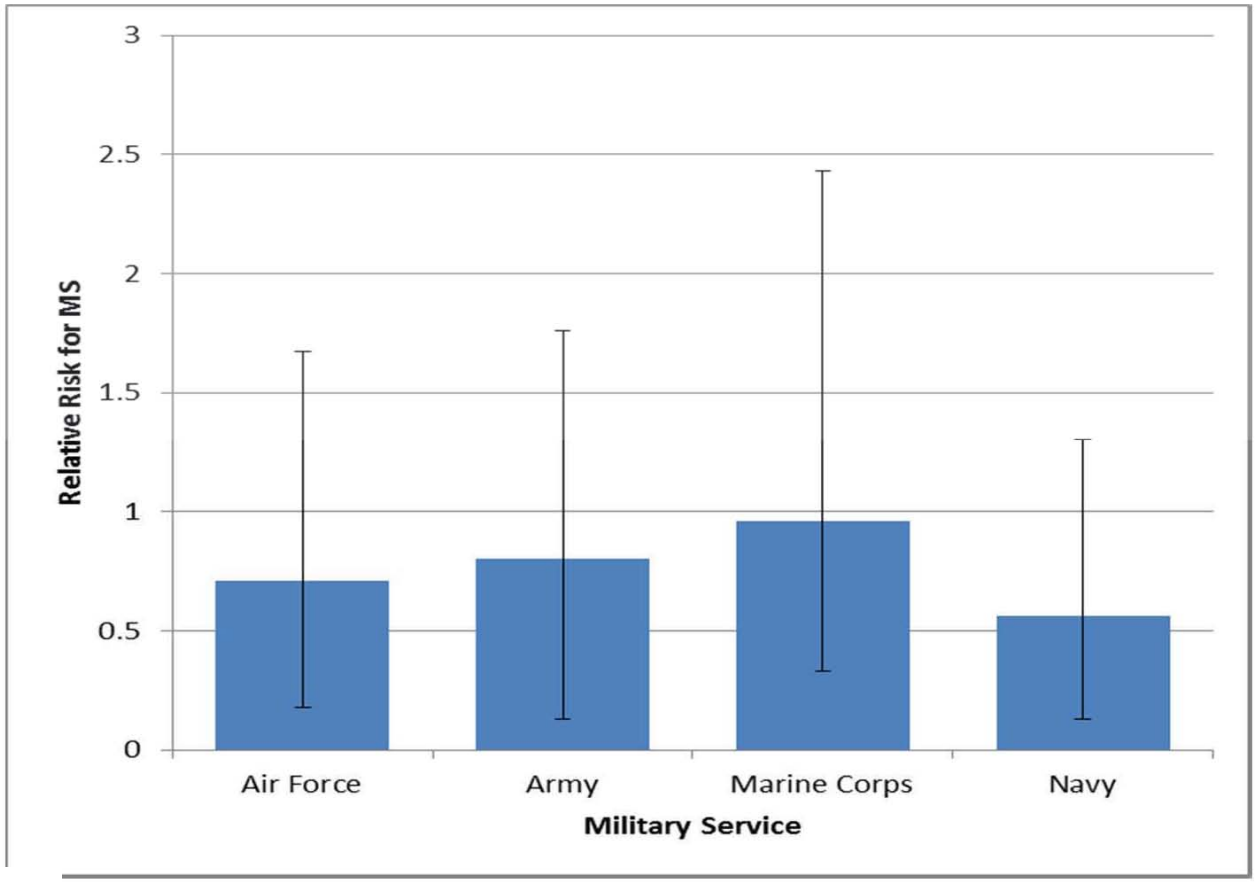

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Conclusions

- Age-specific incidence rates for MS in the GW Era MS cohort are high (overall: 9.6 per 100,000)
  - Blacks were highest among racial groups (12.1 per 100,000)
  - Rates in women were 3x those for men
  - Low rate in Marines (5.3 per 100,000) is unexplained
- Deployment to GW1 was not a risk factor for MS
- Risks for MS onset and disease progression under active investigation

MSCoE Epidemiology Research Group

VA MSCoE

- Parisa Coffman, MPH
- Heidi Maloni, PhD
- Joel Culpepper, PhD
- Jodie Haselkorn, MD, MPH
- John Kurtzke, MD

VA Post-Deployment Health

- Han Kang, PhD
- Clare Mahan, PhD

DoD Serum Repository & WRAMC/DoD Neurology

- Mark Rubertone, MD
- Daniel Correa, MD
- Steve Lewis, MD
- Anthony Frattalone, MD
- Angie Eick, PhD

Funding: VA Merit Review, VA MSCoE, NMSS

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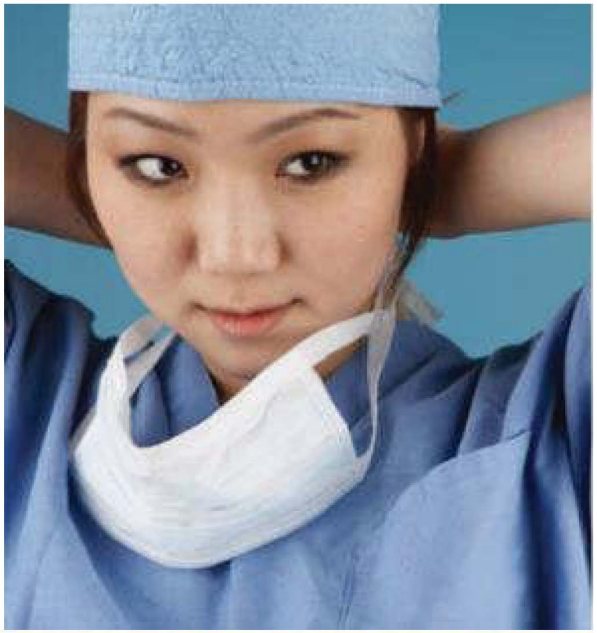
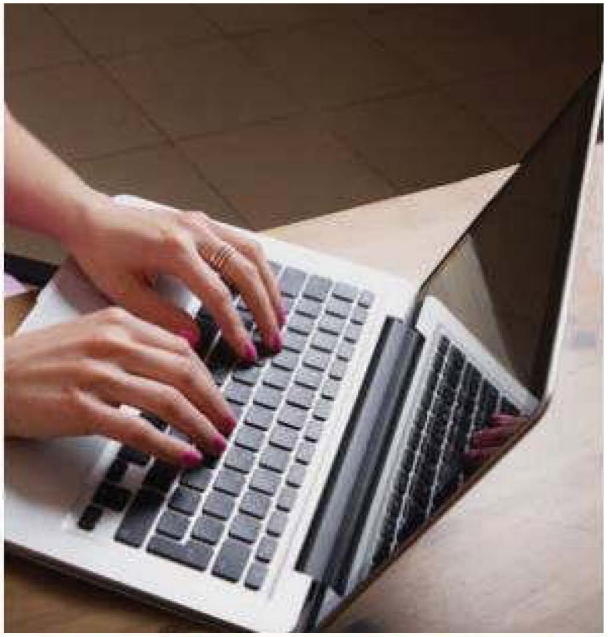
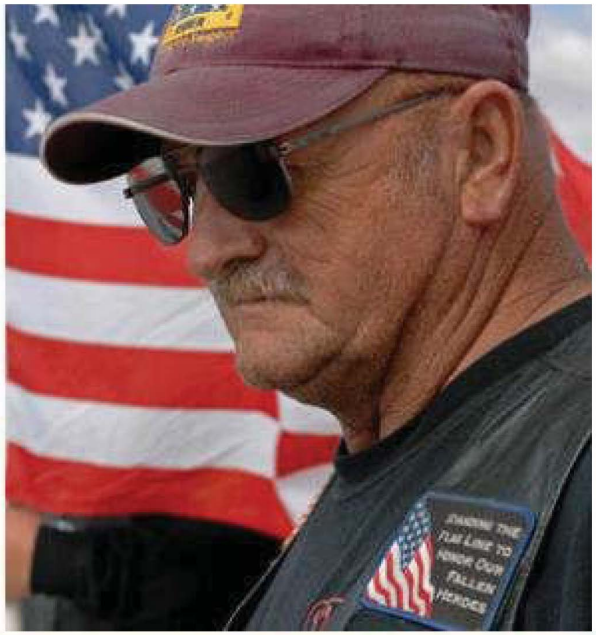

Summary, Conclusions, and Next Steps

Victoria Davey, Ph.D., M.P.H.
Chief Public Health Officer

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April 28, 2014

VA

U.S. Department of Veterans Affairs
Veterans Health Administration
Office of Public Health

Summary

- We thank the Veterans who participated in our studies. Of note, there was high rate of participation in the 3rd Wave of the Gulf War Study.
- OPH's Gulf War Studies have led to numerous peer-reviewed publications, clinical studies and have informed policy.
- The studies documented very high prevalence of multi-symptom illness among deployed Gulf War Veterans, attesting to the need to develop effective treatments
- Certain other diseases of concern, including fibromyalgia, IBS, CFS, are more prevalent among deployed
- Deaths from conditions of concern were not different from the US population (including lung cancer, brain cancer, and suicide).
- The safety of the methods used to survey suicidal tendency was confirmed by examining outcomes of New Generation study respondents who reported thoughts of death or self-harm—attempted suicides and suicides were lower than reported in a study of a comparable clinical population.
- Incidence rates for MS were highest among African Americans. Rates for MS in women were three-fold higher than in men. Marines had incidence rates that were half of those in other military services.

Next Steps

- Through ongoing studies we will characterize more clearly the full scope of health issues being experienced by Gulf War Veterans.
- We will work with VHA Office of Research and Development and GW Research Advisory Committee to utilize these findings to drive future clinical research endeavors.
- We will seek continued dialogue with Gulf War Veterans and the full complement of professionals working in Gulf War research.

Questions

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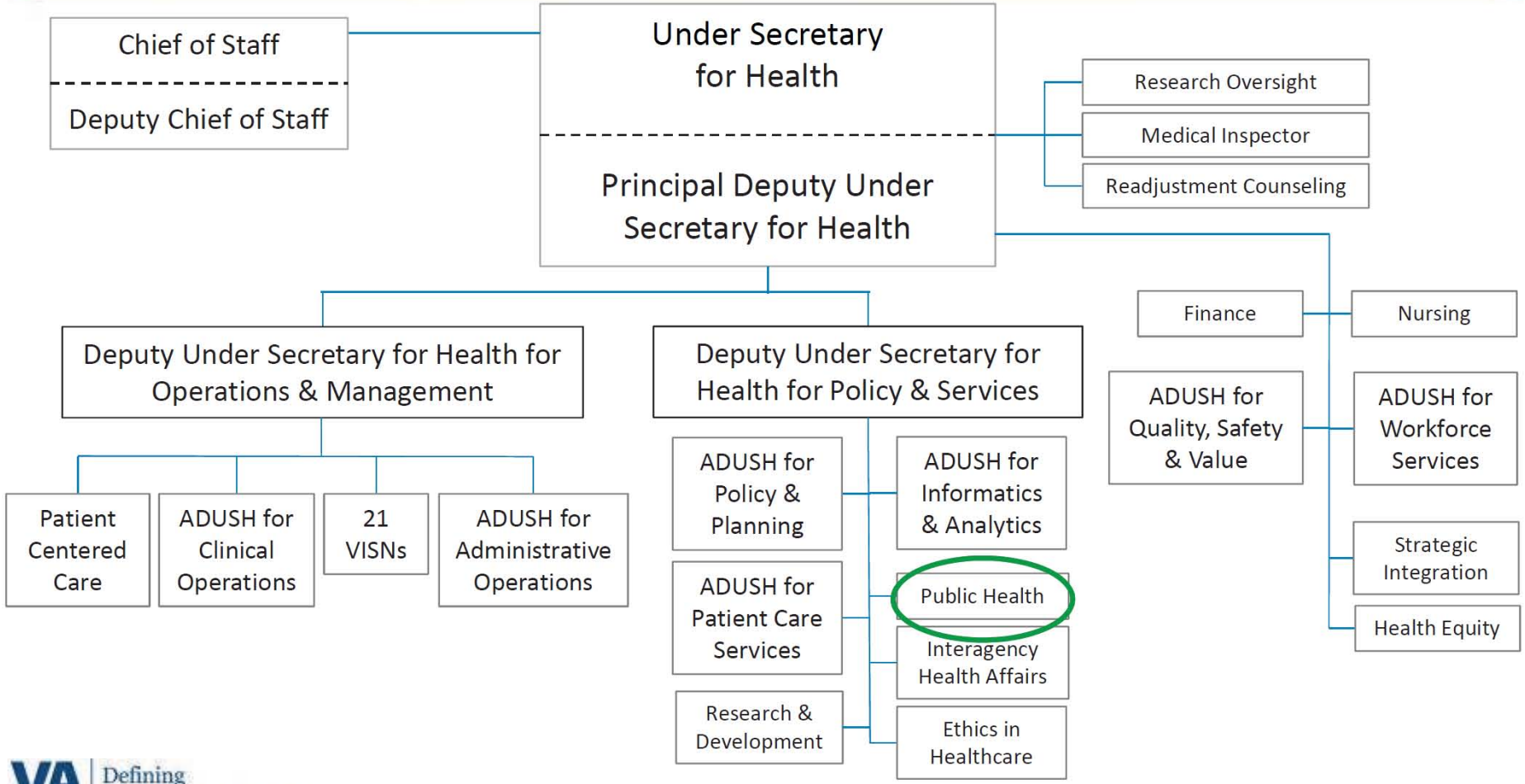
Background on OPH

Where OPH Fits In…



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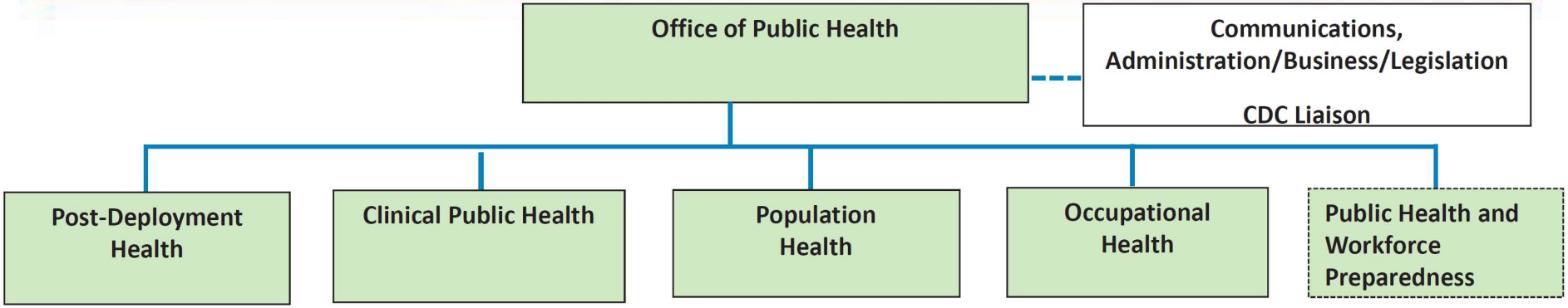
OPH Structure



- Environmental Epidemiology
- Toxicology
- Physical Exposures (e.g., Gulf War, burn pits, Agent Orange)

War Related Illness and Injury Study Center (WRIISC)

Toxic Embedded Fragments & Depleted Uranium Center

- Smoking & Health
- HIV & HCV Programs
- Surveillance, Investigations, Research
- Public Health Infection Control
- National Influenza & Infection: Don't Pass It On Programs

- Assesses & reports health status of Veteran populations
- Measures impact of interventions to improve health and decrease inequities
- State of care reports
- Cohort definition and identification

- Occupational Health Core and Consultation
- Impaired Provider Program
- Employee Health Promotion
- Worker's Compensation
- Workplace Violence Prevention Program
- Safe Patient Handling Program

- Planning for emergencies, disasters, events
- VHA policy
- SME expertise
- Recommendations to VHA leadership
- Support VHA health operations

Veterans Emergency Management Evaluation Center (VEMEC)

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Mission

- OPH's mission is to serve as the leader and authority in public health, a core element essential to VA's ability to fulfill its mission to serve and honor the men and women who are America's Veterans. Within VA, **public health is the science and practice of promoting health and preventing disease** among Veterans and VA staff populations. In this context, health can be affected by natural or human-made environments, present and past occupations, place in society, gender, and other social or individual characteristics.

- The mission is reflected in four pillars that uphold the ideals, initiatives, services, and programs within the office:
    - Surveillance and epidemiology
    - Underserved populations
    - Disease prevention, risk reduction, and health promotion
    - Public health policy and guidance

Post-Deployment Health Leadership

Terry J. Walters, M.D., M.P.H., M.S., C.P.E.
Acting Chief Consultant

Dr. Walters leads programs and policy development related to exposure to environmental and occupational hazards during military service.

Dr. Walters was among the first class of women to graduate from West Point in 1980 and later became the first female commander of the largest military hospital—Womack Army Medical Center at Fort Bragg, North Carolina. In addition to her assignment as a Commander, Dr. Walters also served as the Director of Healthcare Services at Fort Bragg, which she transformed into a leading military treatment facility. Other assignments include combat service in Somalia as a Brigade Surgeon and later in Iraq as a Brigade Commander. She came to VA having been the Department of Defense Liaison to the Office of Health Affairs in the Department of Homeland Security. Dr. Walters' areas of expertise are health care policy development, outcomes management, and clinical informatics.

Dr. Walters is a Veteran of the Gulf War and Operation Iraqi Freedom.

VA HEALTH CARE Defining EXCELLENCE in the 21st Century

Post-Deployment Health Leadership

Paul Ciminera, M.D., M.P.H.
Director, Post-9/11 Era Environmental Health Program

Dr. Ciminera leads important programs on military environmental exposures and contributes significantly to the understanding of post deployment adverse health effects in Veterans. He is currently spearheading the launch of the Airborne Hazards and Open Burn Pit Registry.

Dr. Ciminera comes to VA after 14 years of service as an Army Officer and over seven years of civilian service in the intelligence community. He is a board certified physician in both General Preventive Medicine and Occupational Medicine and brings a wealth of clinical, operational, and policy experience from prior military assignments. Most recently he served as both Acting Chief of the Tripler Army Medical Center (TAMC) Department of Preventive Medicine (where he guided a staff of over 70 public health professionals) and Preventive Medicine Staff Officer for the 18th Army Medical Command (Deployment Support).

Dr. Ciminera is a Veteran of Operation Enduring Freedom.

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Post-Deployment Health Leadership

Ralph Loren Erickson, M.D., M.P.H., Dr. PH
Director, Pre-9/11 Era Environmental Health Program

Dr. Erickson leads programs associated with the pre-9/11 group (e.g., Agent Orange). Prior to joining VA, he held several leadership positions at the Department of Defense, including commander of Walter Reed Army Institute of Research, command surgeon of the U.S. Central Command under General Petraeus, and director of the DoD Global Emerging Infections and Response System.

He retired after more than 32 years of service with the Army. He is a board certified physician in preventive medicine and public health.

Dr. Erickson is a Veteran of the Gulf War and Operation Iraqi Freedom.

Post-Deployment Health Leadership

Robert Bossarte, Ph.D.
Director, Epidemiology Program

Dr. Bossarte oversees research and surveillance studies and projects to better understand the medical consequences of military service.

Before joining the Office of Public Health, Dr. Bossarte served in a number of roles at VA including: Acting Associate Director and Chief for Epidemiology and Population Intervention Research for the VISN 2 Center of Excellence for Suicide Prevention, Director for the Patient Safety Center of Inquiry for Suicide Prevention, Lead Epidemiologist for the Suicide Prevention Program, and Senior Fellow for VA's Center for Innovation.

Dr. Bossarte also provided leadership for a Suicide Prevention Coalition sponsored by Mental Health Quality Enhancement Research Initiative and worked closely with the National Center for Homelessness to understand the associations between housing instability and use of VA services and mental health among Veterans.

Post-Deployment Health Leadership

Aaron Schneiderman, Ph.D., M.P.H., R.N.
Deputy Director, Epidemiology Program

Dr. Aaron Schneiderman serves as Deputy Director of the Epidemiology Program. He has more than 21 years of experience using qualitative and quantitative research methodologies in the areas of occupational and environmental safety and health research with combat Veterans, military reservists, and civilians.

Dr. Schneiderman's work with VA's War Related Illness and Injury Study Center in Washington, D.C. included both clinical work and research with Veterans in the areas of health risk communication, perception of environmental exposures, and physical and psychological health concerns.