

Presentation 14 – Paul Levine

Cancer Patterns in Gulf and Non-Gulf Veterans

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*Preliminary analytic results in this slide
presentation are provided for update purposes
only.*

*Because these analyses are preliminary in nature ,
they are subject to change following additional data
analyses.*

Background

- 1995–AIDS-Cancer Matching Program successfully uses an Automatch program to match files from AIDS and Cancer registries to document previously undetected cancers associated with AIDS while preserving patient confidentiality. . . Cote et al. Prev. Med. 1995; 24: 375-7.
- 1996–Presidential Advisory Committee on Gulf War Veterans' Illnesses recommends long-term studies to investigate cancer rates.
- The North American Association of Central Cancer Registries begins to establish standard procedures for cancer registration in all 50 states and the District of Columbia

Methods

- Files obtained from the Defense Manpower Data Center provided a file with 621,902 veterans arriving in the Persian Gulf between 8/2/90 and 3/1/91 and 746,248 non-Gulf veteran controls.
- Database included names, demographic data, and military service information.

Pilot Study

- Automatch used by New Jersey, a participant in the AIDS-Cancer Matching Program, to match records of New Jersey cancer cases 1991-1999. 135 matches.
- SAS used for match with DC and 323 matches for the years 1991-1999.
- Testicular cancer significantly associated with deployment to the Persian Gulf. Increase apparent 2-3 years after deployment and peaked 4-5 years later.
- Brain cancer and non-Hodgkin's lymphoma had a suggestive association

Levine et al. Military Medicine 2005;170(2):149-153

Follow-up Study

- Three year project supported by ASPH/CDC allowed matching with 6 additional states: California, Florida, Maryland, New York, Illinois, and Texas providing additional matches, 2054 in Gulf and 3383 in non-Gulf veterans.

Demographics

- ~70% of both groups were white and 18% were black
- 86% of the Gulf deployed were males and 79% of the non-Gulf deployed were males
- ~50% of both groups were Army
- Average age in 1991 +/- SD
 - Gulf : 34.3 +/-9.8
 - Non-Gulf : 38.2 +/-10.3
- Average age at diagnosis +/- SD
 - Gulf : 40.6 +/-10.5
 - Non-Gulf : 44.32 +/-10.9
- Active Duty Status
 - Gulf : 80 % Active; 14% Reserve; 6% Guard
 - Non-Gulf : 68% Active; 24% Reserve; 9% Guard

Results by State

State	Population (millions)	Veteran Population (millions)	# of matches		Crude* PIR (95% CI)		
			Gulf	Non-Gulf	Testicular	Brain	NHL
California	33.9	2.6	481	769	1.2 (0.97-1.5)	1.3 (0.93-1.8)	0.8 (0.6-1.2)
Texas	20.9	1.8	631	965	1.3 (1.1-1.6)	1.1 (0.9-1.5)	1.1 (0.9-1.4)
New York	18.9	1.4	213	425	0.9 (0.6-1.4)	1.3 (0.6-2.7)	1.5 (0.7-3.1)
Florida	15.9	1.9	485	839	0.9 (0.6-1.4)	2.0 (1.1-3.6)	1.3 (0.8-2.1)
Illinois	12.4	1.0	184	304	0.8 (0.5-1.3)	0.9 (0.5-1.7)	1.0 (0.6-1.8)
New Jersey	8.4	0.7	45	91	1.7 (0.4-6.4)	1.0 (0.2-6.4)	0.4 (0.1-1.6)
Maryland	5.3	0.5	54	81	0.99 (0.3-3.9)	0.9 (0.4-2.3)	0.6 (0.2-2.1)
DC	0.6	0.04	108	203	3.8 (1.4-9.6)	1.5 (0.3-4.1)	1.0 (0.7-4.2)

Combined Results

- 2167 matches in Gulf and 3560 matches in non-Gulf*
- Crude PIRs (95% CI)
 - Testicular Cancer: 1.22 (1.01-1.47)
 - Brain Cancer: 1.38 (1.08-1.77)
 - NHL: 1.10 (0.80-1.38)
- **Adjusted PIRs (95% CI)**
 - **Testicular Cancer: 0.9 (0.7-1.1)****
 - **Brain Cancer: 1.1 (0.8-1.5)*****
 - **NHL: 0.9 (0.7-1.1)*****

*Only those with diagnosis after 1991 and overlap with DC and MD removed.

** Adjusted for age, age², and race

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Conclusions to Date

- Matching of cancer records with deployment status is feasible and eventually can be performed on a nationwide basis.
- Within particular states, results are suggestive for testicular and brain cancer but thus far no significant differences in combined data.
- Analysis and addition of states are continuing. Interstate differences need to be investigated.

Future Plans (1)

- 1) Additional matches
Pennsylvania, Ohio, Michigan, Georgia, North Carolina, Massachusetts, Indiana, Washington, Missouri, Wisconsin, Arizona
Population=84.2 million
Estimated Civilian Veteran Population=8.3 million
Est. cases/year=351,000
(States chosen in order of population, all NAACCR gold or silver certification)

Future Plans (2)

2. Investigate reasons for state differences
 - Deployment site of reservists
 - Background cancer patterns
 - Registry methodology
3. Consider another match in 5-10 years to allow for longer latent periods

Key Studies

- Gray GC, Coate BD, Anderson CM, Kang HK et al. The Postwar Hospitalization Experience of U.S. Veterans of the Persian Gulf War *N Engl J Med.* 1996; 335: 1505-1513.
- Garland FC, Gorham ED, Garland CF et al. Testicular cancer in U.S. Navy Personnel. *Am J Epidemiol.* 1988; 127: 411-414.
- Knoke JD, Gray GC, Garland FC. Testicular Cancer and Persian Gulf War Service. *Epidemiology.* 1998; 9: 648-653.
- Bullman TA, Mahan CM, Kang HK, Page WF. Mortality in US Army Gulf War Veterans Exposed to 1991 Khamisiyah Chemical Munitions Destruction. *AJPH.* 2005; 95: 1382-1388.