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General Accounting Office  
Washington, D.C. 20548

Program Evaluation and  
Methodology Division

B-272360

June 21, 1996

The Honorable Christopher Shays  
Chairman, Subcommittee on Human Resources  
and Intergovernmental Relations  
Committee on Government Reform and Oversight  
House of Representatives

Dear Mr. Chairman:

This correspondence responds to your request that we assist your subcommittee in evaluating data supplied by the Department of Veterans' Affairs (VA) on the frequency of neoplasms (growths of abnormal tissue, or tumors) among veterans of the Persian Gulf war and military personnel who were not veterans of that war. As we discussed with your staff, we reviewed the pertinent data in order to determine whether they indicated any differences in the rate of neoplasms; whether the differences, if any, could be attributed to Persian Gulf service; and, finally, what additional information would be needed to allow meaningful conclusions on this subject.

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## Results in Brief

The data that VA provided to your staff indicate that Persian Gulf war veterans have a substantially higher rate of diagnosis of neoplasms than nonveterans of that war. However, this difference is not necessarily attributable to service in the Persian Gulf. A number of explanations could be offered, and examining them would involve as much professional judgment as extensive statistical analysis.

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## Background

Since the U.S. troops returned from deployment in the Persian Gulf, many have complained of health problems that they believe result from their service there. Research has shown that U.S. troops were exposed before, during, and after the war to a variety of potential hazards. These include

- hazardous occupational substances, such as the use of diesel fuel as a sand suppressant in and around encampments, the burning of human waste with fuel oil, the presence of fuel in shower water, and the drying of sleeping bags with leaded vehicle exhaust;
- infectious diseases, most prominently leishmaniasis;
- prophylactic agents to protect against chemical and biological weapons;

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- depleted uranium contained in certain ammunition and in the fragments of exploded rounds embedded in casualties;
  - pesticides and insect repellents; and
  - a large variety of compounds contained in the extensive smoke from the oil-well fires that enveloped the region at the end of the war.

The data you asked us to examine relate specifically to the rate of neoplasms found among gulf war veterans.

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## Data Sources

Because of the subcommittee's time constraints, we did not collect original data. We relied exclusively on information that VA and the Department of Defense (DOD) had provided to the subcommittee. The VA data came from three sources: (1) Patient Treatment Files (PTF) that include September 1990 to March 1996 data from VA hospital inpatient discharge records; (2) the Persian Gulf Registry (PGR), which lists, among its information from 1992 to January 1996, all persons who served in the Persian Gulf theater of operations and who apply for care or services from VA or request a health examination under the PGR; (3) the Persian Gulf Mortality Follow-Up Study, a separate VA study of deaths among Persian Gulf and non-Persian Gulf veterans from January 1990 through September 1993.

VA also provided information from DOD's Defense Manpower Data Center (DMDC) that included population totals for both Persian Gulf and non-Persian Gulf veterans.<sup>1</sup> These population statistics are not at the same level of disaggregation as the VA hospital PTF records, but they do provide the total number of persons who were deployed and who were not deployed in the gulf area during the war.<sup>2</sup>

We limited our analysis to three comparisons between veterans of the gulf war and veterans who did not serve there. We compared their (1) rates of diagnosis of neoplasms, (2) rates of surgical procedures relating to neoplasms, and (3) rates of hospital discharge as reflected in PTF.

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<sup>1</sup>The total number of Persian Gulf war veterans was based on the total number of Operation Desert Shield and Operation Desert Storm participants; the total number of non-Persian Gulf war veterans was based on the total number of individuals who were on active duty in the U.S. military during the Persian Gulf war (September 1990 to May 1991) but not deployed in the Persian Gulf area.

<sup>2</sup>VA provided data on the diagnosis of neoplasms by race, gender, age, membership in individual branch of service, and active versus reserve duty status. However, without the population totals for these groups, we could not determine specific rates for them.

## Our Analysis

We combined the VA data on the number of neoplasms diagnosed for both Persian Gulf veterans and non-Persian Gulf veterans with the DMDC population statistics to form neoplasm rates for each group. The number of neoplasms reported for Persian Gulf war veterans represents a total of diagnoses from both PTF and PGR, while the count of neoplasms for non-Persian Gulf war veterans is derived from PTF data.<sup>3</sup> The rate of neoplasm diagnosis among Persian Gulf veterans is more than three times higher than that for non-Persian Gulf veterans.

**Table 1: Number and Rate of Diagnosis of Neoplasms**

Deployment	Diagnosed neoplasms	Total veterans	Rate/percent of diagnosed neoplasms
Persian Gulf	1,691	696,665	0.0024/0.24%
Elsewhere	1,092	1,605,087	0.0007/0.07%

A number of explanations could be offered for this difference between the two groups in table 1. One is that Persian Gulf veterans may be more likely to seek treatment at VA hospitals than their peers who served in other areas during the gulf war period and, therefore, VA is more likely to diagnose and record any medical conditions they present.

We were able to test this hypothesis indirectly by comparing the rates at which Persian Gulf veterans appear in the PTF. We found that Persian Gulf veterans appear in the PTF at a rate 2-1/2 times higher than do their peers. PTF is a measure not of the numbers seeking treatment from VA but of the number of patients discharged from VA hospitals. Nevertheless, the difference in the discharge rate shown in table 2 may well reflect a difference in the rate at which Persian Gulf war veterans seek VA treatment.

**Table 2: Number and Rate of Gulf War and Non-Gulf War Veterans Recorded in PTF**

Deployment	Number of veterans in PTF	Total veterans	Rate/percent of veterans in PTF
Persian Gulf	31,092	696,665	0.045/4.5%
Elsewhere	28,917	1,605,087	0.018/1.8%

The VA data may also indirectly indicate the seriousness of the health threat posed by the neoplasms that VA has diagnosed. VA reported the number of surgical procedures performed on Persian Gulf war veterans

<sup>3</sup>VA informed us that duplication of cases was eliminated before the files were combined.

and non-Persian Gulf war veterans, as well as the number of procedures performed for neoplasms (see table 3).

**Table 3: Number and Rate of Surgical Procedures for Neoplasms**

<b>Deployment</b>	<b>Number of surgical procedures</b>	<b>Total surgery patients</b>	<b>Rate/percent of surgical procedures for neoplasms</b>
Persian Gulf	202	1,748	0.1156/11.6%
Elsewhere	276	2,424	0.1139/11.4%

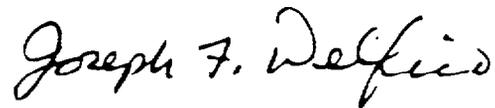
While the rate of neoplasm diagnosis was substantially higher among Persian Gulf veterans, the proportion of surgical procedures for these neoplasms is not significantly different from that for non-Persian Gulf war veterans. This may suggest that the neoplasms diagnosed among Persian Gulf war veterans were less serious than those presented by non-Persian Gulf war veterans, were less amenable to surgical procedures, or resulted from Persian Gulf veterans' choosing to go outside the VA hospital system for surgical procedures at a rate higher than non-Persian Gulf veterans.

Other arguments could be offered that could result in the conclusion that the rate differences for neoplasm diagnosis shown in table 1 either underestimate or exaggerate. For example, it has been suggested that some Persian Gulf war veterans may have been discouraged from seeking treatment at VA for various reasons. Or it may be that VA health care providers have become more sensitive to the possibility of illness associated with service in the Persian Gulf and are, therefore, more likely to diagnose conditions among Persian Gulf war veterans than among others.

None of these arguments can be addressed directly by the data we analyzed. Further insights into possible differences between groups of Persian Gulf war veterans or between different types of neoplasms might be gained if subpopulation statistics were available that corresponded to the level of disaggregation provided by the VA statistics. However, without further information to address possible alternative explanations for the differences in neoplasm rates between Persian Gulf war veterans and non-Persian Gulf war veterans, the difference cannot be confidently attributed to Gulf War service. The task of examining alternative explanations would require both extensive statistical analysis and professional judgment.

If you have further questions, please call me at (202) 512-2900 or Robert White at (202) 512-3092.

Sincerely yours,

A handwritten signature in cursive script that reads "Joseph F. Delfico".

Joseph F. Delfico  
Acting Assistant Comptroller General



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