

# CRS Report for Congress

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## Gulf War Veterans' Illnesses

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### Summary

In 1990 and 1991, approximately 697,000 U.S. troops were deployed in the Persian Gulf during Operations Desert Shield and Desert Storm. The United States suffered relatively few casualties during the brief air and ground war against Iraq. Since returning home, however, many veterans have developed illnesses that appear to be related to their military service in the Gulf. Researchers caution that it may be impossible to identify the causes of these illnesses because of the absence of baseline data on the health of military personnel and the lack of reliable exposure data. This report provides concise answers to a series of questions concerning Gulf War veterans' illnesses, based on currently available scientific information.

### Background

Although the war against Iraq lasted only six weeks, U.S. troops experienced an usually stressful environment and were exposed to numerous known and potential health risks in addition to limited combat. These included temperature extremes, blowing dust and sand, smoke from oil well fires, petroleum fuels and their combustion products, pyridostigmine bromide to protect against nerve gas, anthrax and botulism vaccines, depleted uranium used in artillery shells, pesticides, chemical warfare agents, and pervasive psychological and physiological stress.

Many Gulf War veterans developed debilitating illnesses soon after returning to the United States. Commonly reported symptoms included fatigue, muscle and joint pain, memory loss, and severe headaches. Although a majority of ill veterans have been diagnosed with a recognized disease, a significant number of veterans remain undiagnosed. The array of symptoms reported by Gulf War veterans is popularly known as "Gulf War Syndrome," which suggests the existence of a new disease or syndrome related to military service in the Gulf. However, several expert panels have found no evidence of a new or unique Gulf War-related disease. Sick veterans appear to be suffering from multiple illnesses with overlapping symptoms and causes that are likely to be connected to their Gulf War service.

The Departments of Defense (DOD) and Veterans' Affairs (VA) have taken several steps to address Gulf War veterans' illnesses, including establishing medical programs to identify and treat sick veterans, providing disability compensation to veterans with undiagnosed illnesses, and conducting research on the prevalence, nature, and possible causes of their illnesses. In June 1996, the DOD reversed its position on chemical exposure by announcing that as many as 20,000 troops may have been exposed to nerve gas when a battalion of engineers blew up the Khamisiyah ammunition depot in southern Iraq in early March 1991. Until last summer, the DOD had maintained that there was no compelling evidence of exposure to or detection of chemical warfare (CW) agents. On April 9, amid growing tension and charges of a cover-up, the Central Intelligence Agency (CIA) released a report showing that the agency had solid intelligence in 1986 that thousands of chemical weapons had been stored at Khamisiyah. However, the CIA failed to include the depot on a list of suspected CW sites provided to the Pentagon before the war. The CIA warned the Army of the possible presence of chemical weapons at Khamisiyah just days before the depot was blown up, but the information was not relayed to the engineers who carried out the detonations.

### **What Types of Symptoms Have Gulf War Veterans Presented?**

In August 1992, the VA established a Persian Gulf Health Registry to provide clinical evaluations and treatment for military veterans who served in the Gulf. In June 1994, the DOD established a similar program, the Comprehensive Clinical Evaluation Program (CCEP), for Gulf War veterans still on active duty. As of October 1996, approximately 62,000 veterans had been examined in the VA Registry, and more than 34,000 active duty personnel had requested examinations in the CCEP. Roughly 10% of participants had no detectable symptoms, and many others reported minor complaints. The symptoms most frequently reported by participants in both programs include fatigue, headache, muscle and joint pains, and memory loss. The majority of Registry and CCEP participants have been diagnosed, but approximately 18% of CCEP participants and 20% of Registry participants are undiagnosed and listed as having "ill-defined symptoms and signs."

### **How Many Gulf War Veterans Are Ill?**

Researchers do not yet know the full extent of illness among Gulf War veterans. The VA Registry and CCEP were designed as clinical rather than research programs, and the data cannot be generalized to the entire population of Gulf War veterans. Participants in both the Registry and CCEP are self-selected, symptoms and exposures are self-reported, reported exposures cannot be validated, and there is no comparable control group.

Epidemiologic studies designed to answer questions about the prevalence, distribution, and causes of illness among Gulf War veterans are underway and will continue for years. A recent study found a significantly higher death rate among Gulf War veterans between May 1991 and September 1993, compared to a group of military personnel who were not deployed in the Gulf.<sup>1</sup> However, the excess mortality was due to accidents, especially motor vehicle accidents, and not disease. This study indicates that if there are excess illnesses among Gulf War veterans, they do not appear to have been life-

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<sup>1</sup> Kang, H.K. and Bullman, T.A. Mortality Among U.S. Veterans of the Persian Gulf War. *New England J. Medicine*, v. 335, Nov. 14, 1996. p. 1498.

threatening. A second study examined military hospital records of 547,000 Gulf War veterans who remained on active duty in the two years following the war.<sup>2</sup> It found no excess of unexplained hospitalization among Gulf War veterans, compared to veterans of the same era.

Several studies of small clusters of Gulf War veterans have confirmed the presence of a variety of sometimes debilitating symptoms. A recent study of a representative sample of all Gulf War veterans in Iowa found a significant excess of physical and psychological symptoms, compared to Iowa military personnel who were deployed elsewhere.<sup>3</sup> These symptoms were more common among Gulf War veterans who reported exposure to various chemical agents than among those who reported no such exposure. A limitation of all these studies is that symptoms and exposures are self-reported and therefore subject to recall bias.<sup>4</sup>

### **Are Gulf War Veterans From Other Nations Reporting Similar Illnesses?**

Approximately 1,200 of the 45,000 British troops deployed in the Gulf have reported symptoms similar to those reported by U.S. Gulf War veterans. The British government has established a clinical evaluation program and appointed an independent panel to investigate its veterans' concerns. Smaller numbers of Canadian veterans have also reported the same types of symptoms. However, French veterans have not complained of Gulf War–related illnesses, despite extensive publicity about veterans' concerns in Britain and the United States.<sup>5</sup>

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<sup>2</sup> Gray, G.C. et al. The Postwar Hospitalization Experience of U.S. Veterans of the Persian Gulf War. *New England J. Medicine*, v. 335, Nov. 14, 1996. p. 1505.

<sup>3</sup> The Iowa Persian Gulf Study Group. Self-Reported Illness and Health Status Among Persian Gulf Veterans. *J. Amer. Med. Assoc.*, v. 277, Jan. 15, 1997. p. 238.

<sup>4</sup> Landrigan, P.J. Illness in Gulf War Veterans: Causes and Consequences (Editorial). *J. Amer. Med. Assoc.*, v. 277, Jan. 15, 1977. p. 259.

<sup>5</sup> Darkness at Noon. *Economist*, Jan. 11, 1997. p. 71.

## What Are the Possible Causes of Veterans' Illnesses?

The Presidential Advisory Committee (PAC) on Gulf War Veterans' Illnesses examined exposure and, independently, expected health effects for ten risk factors (see box). In its December 1996 report, the PAC concluded that the objective exposure data on these risk factors are extremely limited. Information on exposure is largely based on anecdotal recollections of veterans, which makes it difficult to establish scientifically a link between illnesses and specific risk factors. Even in the absence of exposure data, the PAC determined that most of the risk factors evaluated are "unlikely to be associated with the health problems currently reported by Gulf War veterans."<sup>6</sup>

### Gulf War Risk Factors

- Biological warfare agents
- Chemical warfare agents
- Depleted uranium
- Infectious disease
- Pesticides
- Petroleum fuels
- Pyridostigmine bromide
- Smoke from oil well fires
- Stress
- Vaccines

As expected from experiences in previous wars, a significant number of veterans have stress-related psychological conditions, such as post-traumatic stress disorder (PTSD) and depression. Stress is also known to cause serious physical illnesses, and some Gulf War veterans report stress-related symptoms, including fatigue, headache, sleep problems, and loss of appetite. The PAC concluded that stress "is likely to be an important contributing factor to the broad range of physical and psychological illnesses currently being reported by Gulf War veterans."

## Were the Troops Exposed to Chemical Warfare Agents?

Based on its review of all the available information, including operational and intelligence logs, and reports from DOD and United Nations officials, the PAC concluded that there is "overwhelming" evidence that CW agents were released during aerial bombings of the storage depot at Khamisiyah. Low-level exposure of troops within a 50-kilometer radius of the depot should therefore be presumed while efforts to collect more precise exposure data continue. The PAC also stated that other site-specific exposures cannot be ruled out, but it concluded that "the best evidence available indicates that theater-wide contamination with [chemical warfare] agent fallout from the air war is highly unlikely."<sup>7</sup>

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<sup>6</sup> Presidential Advisory Committee on Gulf War Veterans' Illnesses. *Final Report*. Washington, U.S. Govt. Print. Off., 1996.

<sup>7</sup> In May 1994, the staff of the Senate Banking Committee released a report based on numerous first-hand accounts and other anecdotal information that provided evidence of possible widespread exposure to chemical warfare (CW) agents. James Tuite, the report's lead investigator, has also compiled information on aerial bombings of Iraq's chemical weapons factories and storage sites. Using satellite weather photographs taken during the bombings, he argues that tons of nerve gas rose in a thermal plume that drifted south over the entire theater of operations. According to Tuite, that would explain the detections by Czech chemical weapons experts deployed in northern Saudi Arabia at the time, and the numerous CW alarms that sounded in U.S., British, and French

(continued...)

### **Is Exposure to Chemical Agents the Cause of Veterans' Illnesses?**

The PAC report concluded that it is "unlikely" that veterans' illnesses are the result of exposure to CW agents. Those agents are extremely toxic, and exposure to small amounts produces immediate (i.e., acute) and characteristic symptoms of poisoning. Numerous animal and human studies indicate that long-term (i.e., chronic) neurological effects may develop after recovery from acute poisoning. However, DOD's medical monitoring and surveillance efforts reported no cases of acute nerve gas poisoning among U.S. military personnel during the Gulf War.

Many ill veterans claim that they were exposed to extremely small amounts of nerve gas, which went unrecognized at the time of exposure. The PAC concluded, however, that the very limited available scientific evidence suggests that so-called subclinical exposure to CW agents does not result in chronic neurophysiological or neuropsychological health effects.

### **Are DOD and the VA Providing Medical Care to Ill Veterans?**

The VA Registry and CCEP (see page 2) provide clinical evaluation and treatment, free of charge, to any Gulf War veteran. Both programs use the same clinical protocol, which includes a medical history, thorough physical examination, laboratory tests, and standard questions regarding possible exposures. The VA refers veterans with undiagnosed symptoms to one of four designated medical centers in Washington, DC, Houston, TX, Los Angeles, CA, and Birmingham, AL. The DOD established a specialized care center at Walter Reed Army Medical Center in Washington, DC, to evaluate and treat Gulf War service members with chronic debilitating symptoms.

Veterans are particularly concerned about the impact of Gulf War military service on reproductive health outcomes (e.g., infertility, birth defects). Whereas active duty personnel and their family members have access to comprehensive reproductive health-care benefits, the VA has extremely limited authority to provide such medical care and counseling to veterans. Both the VA and DOD have implemented innovative programs to help veterans cope with combat-related stress.

### **What Kind of Research is Underway?**

The Departments of Defense, Veterans' Affairs, and Health and Human Services, through the Persian Gulf Veterans' Coordinating Board, have established a comprehensive research program. To date, more than 100 projects have been funded, including several epidemiologic studies at the Naval Health Research Center in San Diego, CA (see footnote 2). Clinical and laboratory research priorities include the possible long-term health effects of low-level exposure to CW agents; the long-term health effects of stress; and the potential long-term health effects of combinations of vaccines, pyridostigmine bromide, and other chemical agents.

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<sup>7</sup>(...continued)  
units during that period.

The DOD plans to spend about \$27 million on Gulf War–related health research in FY1997. In October 1994, the VA established three Environmental Hazard Centers in Portland, OR, East Orange, NJ, and Boston, MA, to support interdisciplinary collaborations between VA and academic scientists. A fourth center was launched recently at the VA medical center in Louisville, KY, to focus on the impact of environmental hazards on reproduction and development.

### **Are Veterans Receiving Disability Compensation?**

In 1994, Congress enacted legislation allowing the VA to pay compensation benefits to veterans for Gulf War–related disabilities caused by *undiagnosed* illnesses.<sup>8</sup> Under regulations issued in February 1995 (38 CFR 3.317), a veteran can be compensated only for undiagnosed illnesses that manifest themselves during Gulf War service or arise within two years of departing from the Gulf. Veterans must provide objective evidence of chronic illness and be at least 10% disabled. However, as of January 1997, the VA had denied 9688 (93.5%) of the 10,357 undiagnosed illness claims that had been reviewed. Approximately 55% of the denied claims were rejected because the illness did not manifest itself until after the two-year presumptive period.

Acting on a recommendation from VA Secretary Brown, President Clinton last month extended the presumptive period by eight years, until December 31, 2001. The VA plans to re-evaluate the claims that were denied on the basis of a two-year presumptive period to determine if they now qualify for compensation under the extended period. Many Gulf War veterans have received compensation for *diagnosable* service-connected illnesses and injuries that accompanied their undiagnosed illness claims. As of January 1997, approximately 27,000 Gulf War veterans had been awarded disability compensation for diagnosed conditions such as hypertension, hearing loss, or knee disorders.

### **Research Issues**

The health concerns of Gulf War veterans have been compared to those of Vietnam veterans, who for years have voiced concern about the long-term health impact of exposure to the defoliant Agent Orange. But there is a crucial difference between environmental exposures in the two conflicts. Researchers studying Vietnam veterans have been able to estimate Agent Orange exposure by measuring dioxin levels in tissue samples. In the case of the Gulf War, none of the chemicals to which U.S. troops were exposed appears to remain in the body for any appreciable length of time. Therefore, researchers cannot measure exposure directly and must instead rely on self-reported exposure information and exposure estimates from unit-level troop location data. These types of data are subject to so much bias and error that they are of limited use in epidemiologic studies. Because of the lack of reliable exposure data, many of the health concerns of Gulf War veterans are unlikely to be resolved. The lack of baseline medical data on the troops prior to deployment further adds to the difficulties that researchers face.

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<sup>8</sup> Persian Gulf War Veterans' Benefits Act, P.L. 103-446, Nov. 2, 1994. This legislation was unprecedented because in the past the VA had always required that compensation be based on clearly diagnosed diseases (e.g., cancer).

Research into the causes of Gulf War veterans illnesses has also been hindered by the DOD's failure to investigate thoroughly possible exposures of U.S. troops to CW agents. The PAC criticized DOD's investigations to date as being "superficial and unlikely to provide credible answers to veterans' and the public's questions." The delay in releasing evidence of site-specific, low-level CW exposures has adversely affected decisions about research priorities and funding. Since last summer's disclosures about Khamisiyah, the DOD has revised substantially its investigatory and research programs related to CW exposure. While many veterans have illnesses likely to be connected to their service in the Gulf, current scientific evidence does not support a causal link to any of the environmental risk factors that have been investigated. Some individuals would have become ill during the past six years whether or not they served in the Gulf. Others are suffering from illnesses related to the extremely stressful conditions in the theater. Continued analysis of Registry and CCEP data may reveal clusters of disease linked to specific exposures that warrant further investigation.<sup>9</sup>

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<sup>9</sup> The VA recently announced the results of a preliminary analysis of 81 registry participants who were involved in blowing up the Khamisiyah depot or were in the immediate area during the detonations. These troops did not report an unusual amount of chronic illness compared to all registry participants, with one exception. About 28% of the 81 Khamisiyah veterans reported muscle and joint pains, compared to 17% of registry participants as a whole.