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THE STATUS OF EFFORTS TO IDENTIFY PERSIAN GULF WAR SYNDROME: RECENT GAO FINDINGS

HEARING

BEFORE THE

SUBCOMMITTEE ON HUMAN RESOURCES

OF THE

COMMITTEE ON GOVERNMENT REFORM AND OVERSIGHT HOUSE OF REPRESENTATIVES

ONE HUNDRED FIFTH CONGRESS

FIRST SESSION

JUNE 24, 1997

Serial No. 105–35

Printed for the use of the Committee on Government Reform and Oversight

U.S. GOVERNMENT PRINTING OFFICE

43–150 CC WASHINGTON : 1997

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THE STATUS OF EFFORTS TO IDENTIFY PERSIAN GULF WAR SYNDROME: RECENT GAO FINDINGS

TUESDAY, JUNE 24, 1997

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON HUMAN RESOURCES,
COMMITTEE ON GOVERNMENT REFORM AND OVERSIGHT,
Washington, DC.

The subcommittee met, pursuant to notice, at 10:20 a.m., in room 2154, Rayburn House Office Building, Hon. Christopher Shays (chairman of the subcommittee) presiding.

Present: Representatives Shays, Snowbarger, Pappas, Sanders, Kucinich, and Allen.

Staff present: Lawrence J. Halloran, staff director and counsel; Robert Newman, professional staff member; R. Jared Carpenter, clerk; Cherri Branson and Elizabeth Mundinger, minority counsels; and Ellen Rayner, minority chief clerk.

Mr. SHAYS. I'd like to call this hearing to order and first apologize to my colleagues. It's my practice to start the hearings on time. And I was at the Budget Committee giving the two reconciliation bills to the committee on behalf of Mr. Kasich, and I was not allowed to leave by the committee. So I'm a little late and I apologize.

I did want the subcommittee to wait because I consider this an extraordinary hearing today and wanted to participate in all of it.

In March 1996, we began these hearings on Gulf war illnesses because many veterans were telling us the Federal response to their plight was blind and passive. They found the research unfocused, their diagnoses skewed toward stress, and their treatments inconsistent or ineffective.

It became clear to us very quickly our veterans were right on all counts.

The subcommittee's goal, like theirs, is to see that all Gulf war veterans are properly diagnosed, effectively treated, and fairly compensated.

Today the General Accounting Office [GAO] will discuss their report, "Gulf War Illnesses: Improved Monitoring of Clinical Progress and Re-examination of Research Emphasis are Needed." Significant findings in this report confirm what sick veterans, physicians, research scientists, and others have been telling this subcommittee consistently over the course of eight previous hearings.

This GAO report, much of our earlier testimony, and more we will hear on Thursday, all speak of an official approach to Gulf war

illnesses still permeated by diffidence, denial, and a desire to embrace preordained, unsubstantiated conclusions.

Sadly, the diffidence, denials, and desire to jump to convenient conclusions continue. The official response to this report by the Department of Veterans' Affairs [VA] and the Department of Defense [DOD] betray the same arrogance and myopia that blinded them to the obvious probability of low-level chemical warfare agent exposures until just last year, when Khamasiyah forced their eyes to open slightly.

In response to the findings and recommendations in this report, the VA and DOD attempted to ignore the message and attack the messenger, challenging GAO's methodology and expertise. It is disappointing the departments took defensive, even petulant, exception to GAO findings and recommendations to improve the quality of health care for Gulf war veterans and refocus the research agenda on treatment.

Just as distressing was the position taken on this report by the President's Advisory Committee on Gulf War Veterans' Illnesses [PAC]. GAO challenged the PAC's conclusions supporting stress as a major cause of Gulf war illnesses, minimizing the threat of Leishmaniasis, and dismissing the long-term health effects of organophosphates exposure.

DOD and, to a lesser extent, the VA endorse these conclusions. By entering into a joint defense of the status quo with the very departments they are charged by the President to oversee, I fear the PAC may have lost sight of a solution and become part of the problem.

When the President's Advisory Committee issued their final report in January, the Special Assistant to the President and Senior Director for Gulf War Illnesses, Rear Admiral Paul Busick, said the administration's future mission for the PAC was "To address the issue of the process that the Department of Defense is using to get to the answers that we need, in terms of investigations into low-level chemicals and those kinds of issues."

Yet, when the GAO, complying with a congressional mandate, reports persistent flaws in that process "are likely to prevent researchers from providing precise, accurate and conclusive answers regarding the causes of veterans' illnesses," the administration's watchdog only growls at the messenger. This report, and the telling responses it has evoked, add weight to the argument that the riddle of Gulf war veterans' illnesses will never be solved from inside the Pentagon or the VA.

Today, on Thursday, and in the weeks ahead, this subcommittee will discuss how issues affecting the health of Gulf war veterans can be liberated from the constraints of military doctrine and medical bureaucracy and how the Gulf war research agenda might be more effectively controlled by an independent body veterans and others can trust.

As in the past, the GAO plays an important role in those discussions. And we welcome their testimony.

At this time the chair would recognize Mr. Sanders.

[The prepared statement of Hon. Christopher Shays follows:]

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Statement of Rep. Christopher Shays
June 24, 1997

In March of 1996, we began these hearings on Gulf War illnesses because many veterans were telling us the federal response to their plight was blind and passive. They found the research unfocussed, their diagnoses skewed toward stress, and their treatments inconsistent or ineffective.

It became clear to us very quickly, our veterans were right on all counts.

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This GAO report, much of our earlier testimony, and more we will hear on Thursday, all speak of an official approach to Gulf War illnesses still permeated by diffidence, denial and a desire to embrace pre-ordained, unsubstantiated conclusions.

Sadly, the diffidence, denials, and desire to jump to convenient conclusions continue. The official responses to this report by the Department of Veterans' Affairs (VA) and the Department of Defense (DoD) betray the same arrogance and myopia that blinded them to the obvious probability of low-level chemical warfare agent exposures until just last year, when Khamasiyah forced their eyes to open slightly.

In response to the findings and recommendations in this report, the VA and DoD attempt to ignore the message and attack the messenger, challenging GAO's methodology and expertise. It is disappointing the departments took defensive, even petulant, exception to GAO findings and recommendations to improve the quality of health care for Gulf War veterans and refocus the research agenda on treatment.

Just as distressing was the position taken on this report by the Presidential Advisory Committee on Gulf War Veterans' Illnesses (PAC). GAO challenged the PAC's conclusions supporting stress as a major cause of Gulf War illnesses, minimizing the threat of *Leishmaniasis*, and dismissing long-term health effects of organophosphate exposures.

DoD, and to a lesser extend the VA, endorsed those conclusions. By entering into a joint defense of the status quo with the very departments they are charged by the President to oversee, I fear the PAC may have lost sight of the solution and become part of the problem.

When the Presidential Advisory Committee issued their final report in January, the Special Assistant to the President and Senior Director for Gulf War Illnesses, Rear Admiral Paul Busick, said the administration's future mission for the PAC was "to address the issue of the process that the Department of Defense is using to get to the answers that we need, in terms of investigations into low-level chemicals and those kinds of issues."

Yet when the GAO, complying with a congressional mandate, reports persistent flaws in that process "are likely to prevent researchers from providing precise, accurate and conclusive answers regarding the causes of veterans' illnesses," the administration's watchdog only growls at the messenger.

This report, and the telling responses it has evoked, add weight to the argument that the riddle of Gulf War veterans' illnesses will never be solved from inside the Pentagon or the VA.

Today, on Thursday, and in the weeks ahead, this Subcommittee will discuss how issues affecting the health of Gulf War veterans can be liberated from the constraints of military doctrine and medical bureaucracy, and how the Gulf War research agenda might be more effectively controlled by an independent body veterans and others can trust.

As in the past, the GAO plays an important role in those discussions, and we welcome their testimony today.

Mr. SANDERS. Thank you very much, Mr. Chairman. And let me just express to you my pride in working with you and my belief that you have taken this whole issue as far as it has gone, plus you've worked in a nonpartisan way. You've been extraordinarily persistent. So I congratulate you and your staff for all of the work that they have done.

With your permission, Mr. Chairman, I would like to submit a document for the record. And this document is a letter to the Presidential Advisory Committee dated June 20, 1997, drafted by my office and signed by 86 Members of the Congress. And in this letter, 86 Members of the Congress agreed that the Presidential Advisory Committee needs to reassess its conclusion that "current scientific evidence does not support a causal link between Gulf veterans' illnesses and exposures while in the Gulf region to the following environmental risk factors assessed by the committee: pesticides, chemical and biological warfare agents, vaccines, pyridostigmine bromide, infectious diseases, depleted uranium, oil well fires, and smoke and petroleum products."

In other words, when I took this letter around to our colleagues, I found very few Members who believed that stress and stress alone was the cause of Persian Gulf illness. I think all of us recognize the important role that stress plays, but very few Members—and I think very few people in the United States of America—believe that stress alone, as the Presidential Advisory Committee suggested, is the cause of Persian Gulf illness.

While we have not yet received a formal response from the Presidential Advisory Committee, as you indicated in your comments, once again, they are defensive, and, once again, they continue to go forward and suggest that anybody who is talking about the role that chemicals have played doesn't understand what they are talking about. I think—let me just give you a couple of examples of the problems that I've had with the Presidential Advisory Committee.

A couple of weeks ago I wrote a letter to the committee because I noticed that, interestingly enough, the DOD in 1995 did a study. And you know what their study concluded? Their study concluded that pyridostigmine bromide combined with DEET and combined with hermathrine has a synergistic effect much more than the additive effect. When you combine the three it has a significant effect on lethality. I found it very interesting that in the Presidential Advisory Committee final report, the word "significant" was changed, and it became a "slight." The word "significant" went to "slight." I found it interesting in reading New York Times articles that when the DOD itself had done the right research—New York Times, Wednesday, May 14 headline: "Study Links Memory Loss to Nerve Gases in Gulf." Interestingly enough, the researcher, Dr. Pendergast, says, "I don't think it's too early to draw conclusions. The type of exposure regime that we employed in the animals and the type of exposures that our troops experienced in the Gulf are analogous. And the types of memory deficits that we've seen in the animals and those reported by Gulf War patients are extremely similar."

In other words, the DOD researcher says, I think we're making progress. What does the DOD say in response to their own study? "In a statement today the Pentagon praised the experiments as im-

portant, but the Department said, 'These initial findings require replication in other species, including non-human.'"

"The Pentagon also questioned whether the experiments in which the rats were infected with the chemicals over a 2-week period offered many clues to the health problems of the veterans. 'The shroud of administration and duration of exposure does not parallel any known human exposure to troops.'"

So in other words, you have this irony. The DOD does the research. The guy that does the research says, I think we've made an important finding. And the DOD attempts to minimize what their own research has done. On and on we have had testimony from witnesses here who have told us they were—Dr. Tucker, remember Dr. Tucker? Fired because he had the courage to go outside of the parameters established by the PAC.

Dr. Mira Sheyavitz, who is a physician who formerly worked at the VA hospital, Northampton, MA, believed that chemicals played a role. She developed a protocol for treatment—did not get her research funded.

Dr. Claudia Miller, who you have had before this committee, also was in line to receive funding to look at chemicals; did not get funded.

Dr. James Morse, after concluding that PB and DEET, when combined, produce toxic effects on cockroaches, was terminated from his employment with the Department of Agriculture.

On and on and on it goes. When conclusions arise that seem to go beyond the paradigm established by the DOD and VA, those researchers get the short shrift. I agree with you, Mr. Chairman. I think the time is now to say, thank you very much, DOD and VA, you've had your opportunity, you've had the last 5 years—you haven't done it. I think we've got to go outside the DOD and the VA. I think we need a Manhattan-type project, as I've said before.

I think the National Institute of Environmental Health Studies might be a good start. They are interested in looking at the role that chemicals have played. And I also want to conclude simply by congratulating the GAO for their research and in helping us understand the failures of what the DOD and the VA have done. Thank you very much, Mr. Chairman.

[The prepared statement of Hon. Bernard Sanders and the letter referred to follow:]

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HUMAN RESOURCES AND INTERGOVERNMENTAL RELATIONS

CHAIR: PROGRESSIVE CAUCUS

STATEMENT OF CONGRESSMAN BERNIE SANDERS AT THE HEARING OF THE SUBCOMMITTEE ON HUMAN RESOURCES

June 24, 1997

Thank you very much Mr. Chairman. And I thank you for holding this series of hearings on Gulf War illnesses. You have been a leader within the Congress in the pursuit of the truth in the area of how chemical exposures relate to Gulf War illnesses.

I would like to begin by requesting permission to submit a document for the record. This document is a letter to the Presidential Advisory Committee, dated June 20, 1997, drafted by my office and signed by 86 Members of Congress.

In this letter, 86 Members of Congress agree that the Presidential Advisory Committee needs to reassess its conclusions that "current scientific evidence does not support a causal link between Gulf veterans' illnesses and exposures while in the Gulf region to the following environmental risk factors assessed by the Committee: pesticides, chemical and biological warfare agents, vaccines, pyridostigmine bromide, infectious diseases, depleted uranium, oil well fires and smoke and petroleum products."

86 Members of Congress agree that the Presidential Advisory Committee needs to reassess its recommendations when it says that federal research should focus more upon stress than upon chemicals as a cause of Persian Gulf War illnesses.

And today it seems as if, because of the essence of this letter, 86 Members of Congress are in general agreement with one of the GAO recommendations in this report---that the DOD and VA give greater priority to research on treatment for ill veterans and on low-level exposures to chemicals and their interactive effects.

While we have not yet received a response from the Presidential Advisory Committee on

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this letter, media reports indicate that they had already decided, very soon after receiving the letter, that they would not reassess their findings and conclusions. I think this is very unfortunate, and only contributes to the public's poor perception of how our government has handled the issue of chemical exposures in the Persian Gulf.

Let me add that in my own smaller-scale review of the Presidential Advisory Committee's report, I also found some problems. One instance involves how the PAC characterized a research study on pyridostigmine bromide and DEET. The Presidential Advisory Committee stated that a DOD study with rats reported that PB caused a **slight** increase in lethality of DEET and permethrin-----**slight**. In looking at the summary of the study provided by DOD, the principle finding is that there is a **signficant** increase in the lethal effects in rats. The Presidential Advisory Committee chose the word slight while the DOD study used the word significant. To me there seems to be a meaningful difference between significant and slight.
The discovery of this mischaracterization of the DOD study, quite frankly, caused me to look with greater scrutiny at the entire report of the Presidential Advisory Committee.

Frankly, at this point in our investigation, I believe that what is required is a "Manhattan-type project"--- an independent agency taking control of researching the issue of how chemical exposures have effected our Persian Gulf veterans, and how the health effects of these exposures should be treated. It is becoming more and more evident that we need this type of approach because, quite frankly, the Department of Defense and the VA have been less than enthusiastic about aggressively pursuing the role of chemical exposures in Persian Gulf War illnesses.

It seems to me that we must appreciate the urgency of this situation---after all, thousands of veterans are suffering, and the Government is doing very little to aggressively pursue the health effects of chemical exposures. What we need is a Manhattan-type project, involving civilian-based agencies and academic and scientific experts from around the country that have significant expertise in the areas of chemical exposures and the concept that combinations of chemicals may have synergistic effects.

The National Institute of Environmental Health Sciences may very well be the most appropriate agency to lead up such an effort. In their research programs, they continually focus upon the health problems which environmental pollutants cause. They have significant expertise on an issue called Multiple Chemical Sensitivity---a phenomenon that many scientists identify as being quite similar to symptoms of Persian Gulf War illnesses.

The National Institute of Environmental Health Sciences has informed me that they are prepared to address three areas of research which are necessary to better understand the relationship between chemical exposures in the Gulf and Gulf War illnesses: (1) capitalizing on the existing body of knowledge of a similar disorder called Multiple Chemical Sensitivity, (2) defining individual genetic differences in the ability to metabolize environmental agents commonly encountered during Desert Storm, and (3) developing a better understanding of how multiple exposures interact to exert their toxicity on an organism. This final category would improve our ability to understand the probable health effects arising from the unique mixtures of environmental agents to which Gulf War Veterans were exposed.

Not only would this research project assist us in understanding the illnesses which presently afflict our Gulf War veterans, it is also necessary and extremely important to develop methods to deal with chemical exposures that American forces may encounter in future conflicts.

Mr. Chairman, in addition to the lines of action we are pursuing through this Subcommittee, I believe that what we should pursue next, through the appropriations process, is directing $10 million dollars to the National Institute of Environmental Health Sciences for purposes of this research. Let's devote a relatively small amount of funds to an independent agency to begin a comprehensive pursuit of chemicals as they relate to Persian Gulf War illnesses. And I urge my colleagues on this Subcommittee to join me in this pursuit.

Thank you very much.

Congress of the United States
Washington, DC 20515

June 20, 1997

Joyce C. Lashof
Committee Chair
Presidential Advisory Committee on
Gulf War Veterans' Illnesses

Dear Dr. Lashof:

In the December, 1996 Final Report of the Presidential Advisory Committee on Gulf War Illnesses, the Committee concluded that "current scientific evidence does not support a causal link between Gulf veterans' illnesses and exposures while in the Gulf region to the following environmental risk factors assessed by the Committee: pesticides, chemical and biological warfare agents, vaccines, pyridostigmine bromide, infectious diseases, depleted uranium, oil well fires and smoke, and petroleum products."

The Committee found rather that; "Stress manifests in diverse ways, and is likely to be an important contributing factor to the broad range of physical and psychological illnesses currently being reported by Gulf War veterans." Consequently, the Committee recommended that; "The entire federal research portfolio should place greater emphasis on basic and applied research on the physiologic effects of stress and stress-related disorders."

While in no way minimizing the role that stress may have played in causing or contributing to health problems experienced by some veterans, we are writing to ask you to reassess your conclusion that current scientific evidence does not support a causal link between the symptoms and illnesses reported by Gulf war veterans and their exposure to a variety of chemicals during their service in the Persian Gulf War. In fact, it is our belief that more and more scientific evidence suggests that a major cause of Persian Gulf illness is the synergistic effect of a wide variety of chemicals to which our soldiers were exposed. Our hope is that by reassessing your conclusion, you will recommend increased research into and treatment for the health effects of chemical exposures experienced in the Persian Gulf.

As you know, the Persian Gulf War theater was a chemical cesspool. It is now acknowledged that our troops were exposed to chemical warfare agents. There is debate and uncertainty as to the extent of that exposure but the Department of Defense confirms that at least 20,000 soldiers were exposed. Further, the Persian Gulf environment included widespread use of leaded petroleum for fuel and dust mitigation. There was also considerable use of pesticides, including pesticides which were sprayed on the uniforms of individual troops and on their skin.

Additionally, Persian Gulf troops were vaccinated against common infectious diseases, as

well as against two agents of biological warfare, anthrax and botulism toxin. Perhaps most importantly, as a result of a waiver from the FDA, the Department of Defense administered to Persian Gulf soldiers the investigational drug, pyridostigmine bromide, as an anti-nerve gas measure.

As you know, over the last several years there have been a number of scientific studies and research reviews which suggest that chemical exposures may have played a key role in the illnesses which tens of thousands of our Gulf veterans are suffering from. A brief description of a few of these studies follows:

Robert W. Haley, M.D., of the University of Texas Southwestern Medical Center published in January of 1997, "Scientific Findings on the Gulf War Syndrome and Action Plans Leading to Treatment for Veterans." This research project concluded that many veterans are suffering from three primary syndromes, due to subtle brain, spinal cord and nerve damage, but not due to stress. He concludes that the damage was caused by exposure to combinations of pyridostigmine bromide, DEET and pesticides. Different combinations of the chemicals appear to have caused the three different syndromes.

Mohamed Abou-Donia, a Duke Pharmacologist, and Tom Kurt, of The University of Texas Southwestern Medical Center in Dallas, published a study in the May, 1996 issue of Journal of Toxicology and Environmental Health. This study, conducted on hens, concluded that pyridostigmine bromide, in combination of DEET and permethrin caused neurological deficits in the test animals which are similar to those reported by Gulf War veterans.

Interestingly, in May of 1995, the DOD published its own study which concludes, "there is a significant increase in the lethal effect in rats given pyridostigmine bromide, permethrin and DEET simultaneously by gavage when compared to expected additive lethal effect of the individual compounds." This study, which received relatively little public notice when it was released, was recently published in the Journal of Toxicology and Environmental Health.

More recently, Dr. Abou-Donia conducted another research project with the VA Medical Center, Durham North Carolina. This research showed that when rats were given pyridostigmine bromide and then put in stressful conditions, pyridostigmine bromide was able to cross the blood-brain barrier, leading to suppressed AChE levels. The research forecasts that similar blood-brain barrier alterations in veterans may have contributed to neurological deficits of some Gulf War veterans who were exposed to these chemicals during the war.

Another study, conducted by Friedman, Kaufer, Shemer and others at the Department of Biological Chemistry, Life Sciences Institute, Hebrew University in Israel, presents evidence that stress may make the blood brain barrier permeable to PB. The Veterans Affairs, April, 1997 Report to Congress states that this study may explain the acute symptoms of individuals who took PB. This study was published in Nature Medicine in 1996.

Dr. Garth Nicolson of the University of Texas, Department of Tumor Biology, and Dr. Nancy Nicolson of the Rhodon Foundation for Biomedical Research have conducted research which indicates that many of the symptoms of Gulf War Syndrome may be caused by chronic pathogenic mycoplasma infections. The Nicolsons relate these infections to exposures to warfare

agents in the Gulf.

Dr. Satu Somani, PhD. of Southern Illinois University, School of Medicine concludes, in a statement before the House Subcommittee on Human Resources that in light of "experimental proof and historical evidence of symptoms such as impaired concentration and memory, headache, fatigue and depression of the workers who worked in organophosphate industry, I consider that the illness associated with Gulf War veterans may be due to low dose sarin exposure and intake of pyridostigmine and exposure to pesticides and other chemicals. The adverse effects of these were amplified by physical stress."

Dr. Myra B. Shayevitz, of the Northhampton VAMC, testified before the House Subcommittee on Human Resources that; "Experience at Northampton VAMC has led us to believe that the unexplained health problems of some Persian Gulf veterans may relate to the combination of chemical, physical and psychological stressors unique to the Desert Storm operation." In summary, Dr. Shayevitz testified that veterans seen at the VAMC facility complained of multi-system symptomology which is remarkably similar to the syndrome which has been labeled Multiple Chemical Sensitivity. Multiple Chemical Sensitivity is a disorder in which multiple symptoms occur in multiple systems or organs of the body as a result of exposure to chemicals.

Dr. Claudia Miller, assistant professor in allergy/immunology and environmental medicine at the University of Texas Health Science Center-San Antonio, consultant to the VA on the Gulf veterans' health problems, and a member of the VA's Persian Gulf Expert Scientific Advisory Committee, described the similarities between the Gulf veteran's symptoms and those of some civilians exposed to organophosphate pesticides, carbamate pesticides, or low levels of volatile organic chemical mixtures in a 1995 paper published in Archives of Environmental Health entitled, "Chemical Sensitivity Attributed to Pesticide Exposure Versus Remodeling." In testimony invited by your Committee, in several recently published papers, and in the second edition of the book Chemical Exposures: Low Levels and High Stakes, (co-authored by MIT Professor Nicholas A. Ashford, Ph.D.,, J.D.), she has presented compelling evidence that we may in fact be witnessing the emergence of a new mechanism or theory of disease, described as "toxicant-induced loss of tolerance."

Dr. Howard B. Urnovitz, PhD, has focused his research on how chemical and infectious agents interact to initiate and maintain a chronic disorder. He testified before the House Human Resources Committee that he became involved with Gulf War illnesses because the symptoms were similar to those of a dozen unexplained epidemics over the last 60 year. From his research survey, Dr. Urnovitz concluded, "Syndromes associated with organophosphate-induced delayed neuropathy could explain many of the observed and unexplained illnesses."

Dr. James I. Moss and Dr. Arthur Hume recently conducted research which focused on the possible interactions that might produce symptoms similar to those experienced by Persian Gulf veterans. Preliminary research on mice indicates that toxicity of pyridostigmine bromide increases when combined with caffeine or adrenaline.

In research on cockroaches conducted in 1993, Dr. Moss, when working for the Department of Agriculture, came to the conclusion that PB and DEET, when combined with each

other, were much more toxic than when used separately.

Dr. Frank H. Duffy, MD of the Department of Neurology Children's Hospital and Harvard Medical School, presented the following testimony to the House Human Resources Subcommittee: "Studies performed or funded by the US Army in the past clearly demonstrate, for both monkey and man, that exposure to the nerve agent, Sarin, can produce long term alteration of brain function. Levels of exposure capable of producing such late effects may not be recognizable by subjects, acutely, especially if they are unaware of what is happening and/or are distracted by other activities."

A study published in the Journal of Neurology, conducted by Jamal, Hansen, Aparcopoulos and Pedan focused upon evidence of peripheral and central nervous system dysfunction in veterans with Persian Gulf War illness that may have been caused by chemical exposure. The study concluded that there may have been a dysfunction in the nervous system of the veterans which were assessed, and that further studies were required to confirm and characterize this dysfunction.

Dr. William Rea of the Environmental Health Center in Dallas has treated over 60 Persian Gulf veterans, with a protocol that includes chemical-free environment, nutritional supplements, injection therapy and heat therapy. Dr. Rea concludes that neurotoxic environmental exposures and other personal exposures prior to and during deployment in the Gulf War theater of operations, including burning oil and smoke, pesticides, sand irritation, inoculations and nerve gas may have resulted in chronically deregulated immune and nonimmune detoxification systems, resulting in multi-system illness in veterans.

Dr. Mark A. Prendergast, of the Medical College of Georgia, and others, recently published a study in the journal Psychopharmacology, which suggests that exposures to low levels of nerve gas and some pesticides can lead to memory loss, a common complaint among Gulf War veterans.

The above references indicate that there is a wide array of scientific evidence available that leads to the conclusion that some Gulf War veterans are suffering illnesses related to chemical exposures in the Gulf. Moreover, many of the studies specifically link pyridostigmine bromide and pesticides with adverse health effects, similar to those our veterans are suffering from. While we agree that effects of stress must be considered and studied in order to better address the myriad of problems which Gulf War veterans face, we urge the Committee to now place your emphasis and focus on the role which chemical exposures played in the health problems of veterans who served in the Gulf War.

We would also like to express our concern that there is a feeling among the public that, for whatever reason, various agencies of the United States Government have been less than enthusiastic about addressing the issue of the relationship between chemicals and Persian Gulf illness.

As you know, it took over five years before the DOD and CIA publicly acknowledged that American troops were exposed to chemical warfare agents. The DOD, today, acknowledges that they do not yet know the full extent of the exposures.

A number of government researchers have either been fired or failed to receive support in investigating the possible relationship between chemicals and Persian Gulf illness:

Dr. James Moss, after concluding that PB and DEET when combined produce toxic effects on cockroaches, was terminated from his employment with the Department of Agriculture.

In 1993, in invited testimony before the Subcommittee on Oversight and Investigations of the Committee on Veterans Affairs, Dr. Claudia Miller called for a specialized research facility, an environmental medical unit, in order to test scientifically whether ill Gulf War veterans are sensitive to very low levels of common chemicals, as many of them now report. Although Congressional appropriations for half the costs of the facility were obtained through a bipartisan effort and DOD agreed to fund the remainder, DOD failed to implement the project. No such research facility currently exists that would allow physicians to diagnose or rule out chemical sensitivity in the veterans.

Dr. Myra Shayavitz, a VA physician, at Northampton Massachusetts VA hospital was given preliminary support by the VA for a treatment project based on the belief that Persian Gulf veterans were suffering from chemical exposures. Despite initial support, Dr. Shayavitz's research project was never funded and she eventually left the VA.

Dr. Jonathon Tucker, PhD, served on the Presidential Advisory Committee staff as the senior policy analyst responsible for investigating incidents of chemical and biological agents exposures from August to December, 1995. Dr. Tucker was summarily dismissed after aggressively attempting to understand the extent of chemical exposures in the Gulf.

In conclusion, we, the undersigned Members of Congress, urge the Presidential Advisory Committee to reevaluate the conclusions that were reached in the Final 1996 Final Report. We believe that the evidence is clear that exposure to a wide variety of chemicals in the Persian Gulf may be a significant factor in Persian Gulf illness.

We look forward to hearing your reply. Thank you for your consideration.

Sincerely Yours,

Lucille Roybal-Allard

Maxine Waters

Ron Barrett

Bob Filner

Sherrod Brown

Dennis J. Kucinich

Patsy T. Mink

Gerald Nadler

M.O. Sabo

John Olver

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HUMAN RESOURCES AND INTERGOVERNMENTAL RELATIONS

CHAIR: PROGRESSIVE CAUCUS

Members of Congress who have signed onto Sanders' June 20, 1997 letter to the Presidential Advisory Committee on Gulf War Illnesses, urging them to reassess their findings and recommendations

Bernie Sanders (VT)
Gary Ackerman (NY)
Lucille Roybal-Allard (CA)
Nydia Velazquez (NY)
Maxine Waters (CA)
Xavier Becerra (CA)
Richard Neal (MA)
Steny Hoyer (MD)
Bobby Rush (IL)
Danny Davis (IL)
Dennis Kucinich (OH)
Patsy Mink (HI)
Jerrold Nadler (NY)
Martin Olav Sabo (MN)
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Sander Levin (MI)
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Jon Fox (PA)
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Robert Scott (VA)
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Robert Cramer (AL)

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Mr. SHAYS. Before recognizing other Members, I would just like to ask unanimous consent that all members of the subcommittee be permitted to place any opening statement in the record and that the record remain open for 3 days for that purpose. And without objection, so ordered. And further ask unanimous consent that all witnesses be permitted to include their written statements in the record. And without objection, so ordered.

[The prepared statements of Hon. Edolphus Towns and Hon. Benjamin A. Gilman follow:]

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ONE HUNDRED FIFTH CONGRESS

Congress of the United States

House of Representatives

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OPENING STATEMENT OF

REP. EDOLPHUS TOWNS
RANKING DEMOCRATIC MEMBER

BEFORE THE
SUBCOMMITTEE ON HUMAN RESOURCES

JUNE 24, 1997

Mr. Chairman, thank you for holding today's hearing on the governmental response to the illnesses experienced by the Persian Gulf War veterans. This is the ninth hearing we have had on this topic and I believe we have broken new ground in every hearing. Therefore, I look forward to hearing the testimony of the General Accounting Office, today's only witness.

Under the requirement of the FY1997 Defense Authorization Act, the GAO analyzed the effectiveness of the government's clinical care and medical research programs relating to illnesses that members of the armed forces might have contracted as a result of their service in the Gulf War. Specifically, the GAO evaluated efforts by the DOD and VA to assess the quality of treatment, diagnostic services, follow up care, research strategy, and the consistency of official conclusions with available data.

The GAO found that (1) neither the DOD nor the VA has systematically attempted to determine whether ill veterans have improved or deteriorated since their first diagnostic examination; (2) the current epidemiological research will not provide precise, accurate and conclusive answers because of formidable methodological programs and lacks a coherent, focused approach; and (3) the President's Committee reached several conclusions in its final report without sufficient evidence.

In essence, the GAO found that each of these failings feed upon the next. The lack of a comprehensive and integrated database makes it difficult to keep track of medical complaints experienced by veterans and clinical responses to those symptoms. Without this kind of centralized information, it is difficult to determine the presence of trends and associations in symptoms. Moreover, because personnel were dispersed throughout military and civilian life, their health care would be provided by different agencies using different computer systems.

Therefore a centralized record system would enable the agencies to develop a universal view of the medical problems of veterans or personnel serving in the Gulf. Because the DOD or VA did not have a universal view of the similarity of symptoms and other factors, they failed to see the existence of a connected set of events and obtain information from veterans about exposures and locations while the information was still recent. This information deficit hindered the agencies' ability to properly direct subsequent studies. Moreover, the failure of location data impedes and compromises the epidemiological research because it requires that the studies operate with self reported instances of exposure which may not be reliable. Finally, because of the need to find an explanation for the symptoms experienced by the veterans, but lacking an understanding of the true nature of their symptoms, the agencies advanced explanations which were not supported by the data. These attempts to create rationales distracted from funding for research into the identification of actual causes.

These are very strong allegations which challenge not only the validity of on-going research but the necessity of every study to date on the health problems faced by the Persian Gulf War veterans. While I am not ready to throw out that research, I do believe that we must resolve the questions that have been raised by this report. I believe that we cannot rush to judgement. We must remember that the agencies will be here to respond to the charges raised in this report in two days. Again, thank you Mr. Chairman for calling today's hearing and I look forward to hearing today's witnesses and the witnesses we will examine later in the week.

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MR CHAIRMAN, I WOULD LIKE TO THANK YOU FOR CONVENING THIS HEARING THIS MORNING AS PART OF YOUR SERIES OF ONGOING HEARINGS RELATED TO GULF WAR SYNDROME. I BELIEVE THESE HEARINGS ARE IMPORTANT AS THEY HELP KEEP THE DEPARTMENT OF DEFENSE FOCUSED ON AN UNCOMFORTABLE ISSUE, AND REMIND BOTH OFFICIALS AT THE PENTAGON AND THE MEMBERS OF THE PUBLIC, OF CONGRESS' DETERMINATION TO ADDRESS THIS UNFORTUNATE LEGACY OF THE GULF WAR.

THE TWO HEARINGS THIS WEEK ARE PARTICULARLY IMPORTANT BECAUSE THEY DEAL WITH THE RECENTLY RELEASED REPORT FROM THE GENERAL ACCOUNTING OFFICE ON GULF WAR ILLNESSES.

THIS STUDY BY THE GAO HAS REACHED MARKEDLY DIFFERENT CONCLUSIONS THAN THOSE CONDUCTED BY THE DOD AND THE PRESIDENTIAL ADVISORY COMMITTEE.

IN PARTICULAR, THE GAO STUDY HAS REACHED SEVERAL DISTURBING, BUT NOT SURPRISING, CONCLUSIONS. OF THESE, THE MOST DISTURBING IS THAT THE DOD AND VA HAVE NO SYSTEMATIC APPROACH TO MONITORING THE HEALTH OF GULF WAR VETERANS AFTER THE INITIAL EXAMINATION, AND THAT THERE ARE NO PLANS TO ESTABLISH ONE.

LIKEWISE, I WAS ALSO DISTURBED BY THE CONCLUSION THAT THE DOD AND VA CONCENTRATED RESOURCES ON INVESTIGATING CERTAIN HYPOTHESES, SUCH AS STRESS FACTORS, WHILE IGNORING OR DOWNPLAYING OTHERS, SUCH AS EXPOSURE TO

DEPLETED URANIUM AS WELL AS EXPOSURE TO CHEMICAL OR BIOLOGICAL AGENTS.

I AM NOT SURPRISED THAT BOTH THE DOD AND VA HAVE QUESTIONED THE CONCLUSIONS REACHED BY THIS GAO STUDY. THROUGHOUT THIS ENTIRE PROCESS THEIR TACTIC HAS BEEN TO SHIFT BLAME WHEREVER POSSIBLE, TO REFUSE TO ADMIT ANY WRONGDOING, AND TO FAIL TO TAKE ANY RESPONSIBILITY FOR THE HEALTH OF THE VETERANS.

THE CONCLUSION THAT STRESS IS THE PRIMARY CAUSAL FACTOR BEHIND THE ILLNESSES IS AN EASY AND CONVENIENT ANSWER. IT SHIFTS THE BLAME AND RESPONSIBILITY FROM THE DOD TO THE INDIVIDUAL VETERAN. FRANKLY, I EXPECTED BETTER FROM OUR LEADERS IN UNIFORM.

BOTH THE DOD AND THE VA HAVE ADOPTED A REACTIONARY POLICY, ONLY MOVING FORWARD WHEN COMPELLED TO BY CONGRESSIONAL PRESSURE.

FOR YEARS THE OFFICIAL LINE WAS THAT TROOPS WERE OT EXPOSED TO CHEMICAL OR BIOLOGICAL AGENTS. NOW, THE DOD HAS CONCEDED THAT SUCH EXPOSURES DID OCCUR, BUT THAT THEY COULD NOT POSSIBLY BE THE CAUSE OF ANY ILLNESS. YET, IF THEY WERE NOT HONEST WITH THE PUBLIC AND THE CONGRESS FOR THE FIRST FIVE YEARS AFTER THE WAR, WHY SHOULD WE BELIEVE THEM NOW?

MR CHAIRMAN, AS I HAVE SAID BEFORE IN EARLIER HEARINGS ON THIS SUBJECT, WE IN CONGRESS NEED SOME STRAIGHT, HONEST ANSWERS FROM THE DOD.

IT WAS BAD ENOUGH TO DISCOUNT THE THOUSANDS UPON THOUSANDS OF DETECTIONS THAT OCCURRED DURING THE WAR. WHAT IS WORSE IS THE PATTERN OF DECEIT AND MISREPRESENTATION THAT HAS BEEN WAGED WITH THE CONGRESS AND THE AMERICAN PEOPLE. IF WE HAD A PROBLEM IN ADDRESSING WIDESPREAD CHEMICAL EXPOSURES DURING THE GULF, LET'S ADMIT IT AND MOVE ON.

I HOPE THAT THIS GAO REPORT SERVES AS THE TURNING POINT ON THIS ISSUE, AND ALLOWS FOR OPEN AND HONEST DEBATE ABOUT GULF WAR ILLNESSES.

TO CONTINUE THE PRESENT COURSE DOES NOTHING TO HELP THE VETERAN WHO PUT HIS LIFE, AND NOW IT APPEARS BOTH HIS AND HIS FAMILY'S FUTURE HEALTH, ON THE LINE FOR HIS COUNTRY.

Mr. SHAYS. And at this time, the vice chairman of the subcommittee, Mr. Snowbarger.

Mr. SNOWBARGER. Thank you, Mr. Chairman. With the opportunity to place opening statements in the record, I'm anxious to hear what the witnesses have to say today. And I'll pass on an opening statement.

Mr. SHAYS. I thank the gentleman. Mr. Kucinich, you have the floor.

Mr. KUCINICH. Thank you very much, Mr. Chairman, members of the committee. I want to thank you again for your persistent efforts in this area of studying the Gulf war syndrome. As I've had the opportunity to be on this committee and to hear the Chair's appeal for more information, I keep thinking about the men and women who were called to serve this country and who do serve this country, and how when they move forward to defend this country, if they become hurt as a result or injured or ill as a result of that defense, then it's the country's responsibility to defend them.

And it's very clear from the evidence which has been presented that our country has failed to defend the people who have defended this country. The Department of Defense, in its many years of dealing with this, has become twisted in its approach. As it focuses its efforts in protecting America's interests against outside enemies, when confronted with the serious possibility of its own ineptitude, its own failures, its energies have become twisted and rechanneled to calling our very own troops an enemy. And the insistence of our troops on simple justice somehow becomes an impediment to the working of the Department of Defense.

It's unfortunate that those who have handled this issue in the Department of Defense have not had the perceptiveness or the concern to determine the true causes of the Gulf war syndrome as this study has done. And you know, Mr. Chairman, as I think about it, you wonder, what does this say about the ability of those who are running the Department?

Because I don't think we can look at these things in isolation. Because if we would take something as important as the treatment of our very own soldiers, or in this case, the mistreatment, and use that as a measure of how the Department is run, it really raises questions much larger than the scope of this committee about the Nation's defense. How do we treat our soldiers? How do we treat our veterans? Do they deserve the kind of cover-up which has ensued throughout the history of dealing with this Persian Gulf syndrome?

I'm grateful to be on a committee which has the integrity and the willingness to look into questions that other branches of the Government haven't. And I'm looking forward to the presentation of the GAO report. And once again, I want to thank Chairman Shays for his dedication to the American people and to veterans and to those in the service who really rely on you and on this committee for an opportunity to receive some simple justice. Thank you.

Mr. SHAYS. Thank the gentleman. Mr. Allen.

Mr. ALLEN. Thank you, Mr. Chairman.

Mr. SHAYS. I'm sorry. Mr. Pappas, you would be recognized. Excuse me, Mr. Allen.

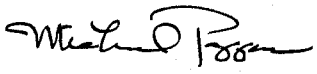
Mr. PAPPAS. Thank you, Mr. Chairman. I want to thank the folks for being here today. And Mr. Chairman, I want to commend you for calling this hearing, which is really the continuation of an effort that you began, I know, prior to my serving in Congress. But certainly I've been fortunate to participate in other hearings concerning the Persian Gulf war syndrome.

The recent GAO report that has been issued on the subject is, quite frankly, very disturbing. The notion that both the Department of Defense and the Department of Veterans' Affairs did not do a thorough job in addressing the health concerns of our Gulf war veterans unfortunately is not surprising when one considers it took the Pentagon to admit that at least 20,000 soldiers were presumed to be exposed to chemical weapons.

Mr. Chairman, in past hearings conducted by the subcommittee, veterans have testified about their difficulty in getting a proper diagnosis and treatment from both the DOD and the VA doctors. Unfortunately, many of them, it was suggested that they are just suffering from some mental illness. But this report underscores the need to have an independent panel review this evidence and help address the concerns of our Nation's veterans.

I look forward to hearing the testimony by the GAO today on their study. I hope corrective measures can begin soon to help our veterans, who are coping with their illness. We certainly owe it to them. I thank the chairman.

[The prepared statement of Hon. Michael Pappas follows:]



Statement of Congressman Mike Pappas
Before the Government Reform and Oversight: Human Resources and Intergovernmental Affairs Subcommittee "Hearing on the Status to Identify Persian Gulf War Syndrome: Recent GAO findings"
June 24, 1997

Mr. Chairman- I commend you for calling this hearing today so that we can as a Congress can continue to get to the bottom of Persian Gulf War Syndrome. The recent Government Accounting Office (GAO) report that has been issued on this subject is frankly very disturbing. The notion that the Department of Defense (DoD) and the Department of Veterans Affairs (VA) did not do a thorough job in addressing the health concerns of our Gulf War veterans is not surprising when one considers it took the Pentagon five years to admit that at least 20,000 soldiers were presumed to be exposed to chemical weapons.

Mr. Chairman, in past hearings conducted by this subcommittee veterans have testified about their difficulty in getting a proper diagnosis and treatment from DoD and VA doctors. The GAO report further underscores the need to have an independent panel review this evidence and help address the concerns of our nation's veterans. I look forward to hearing testimony by GAO today on their study and I hope corrective measures can begin soon to help our veterans who are coping with their illness. We owe it to them.

Mr. SHAYS. I thank the gentleman. I'm sorry, Mr. Allen. You do now have the floor.

Mr. ALLEN. Thank you, Mr. Chairman. I appreciate your leadership, that of Mr. Sanders and the other members of this committee, in examining the effectiveness of the Federal Government, especially Departments of Defense and Veterans' Affairs, in identifying the causes and the appropriate treatment for the deteriorating health of so many of our veterans who served in Desert Storm.

There are about 697,000 men and women of our armed forces who served in the Persian Gulf. And hundreds of thousands are suffering from a series of debilitating ailments. And it is disheartening and alarming that the Federal agencies responsible for their medical care have failed on three fronts, according to this recent GAO report.

The GAO found that, No. 1, that the Departments of Defense and Veterans' Affairs have failed to determine whether ill veterans have improved or deteriorated since their first diagnostic examination. Second, the current research will not provide precise, accurate, and conclusive answers because of the formidable methodological problems. And this research also lacks a precise, focused approach. Third, the President's Committee reached several conclusions in its final report without sufficient evidence. It seems clear to me that the Federal Government has failed in its efforts to address the cause and treatment of Gulf war illnesses, and renewed efforts must be undertaken to improve the monitoring of clinical progress and to explore new avenues in medical research.

I do not underestimate the difficulty of this project, because the causation of these kinds of illnesses is so much more complex than the kinds of illnesses that most doctors, including military doctors, are trying to deal with on a normal basis. It requires more information, more comprehensive information from a wider variety of sources than is typical. But nevertheless, the fundamental point is, we sent our men and women to the Persian Gulf. We have ignored their concerns and their complaints for too long. And it is time to figure out how to set the record straight, how to take care of the veterans who have been suffering, how to figure out what happened, and now what we do about it.

And I want to thank those who are here to testify today. I look forward to hearing your testimony. Thank you, Mr. Chairman.

Mr. SHAYS. I thank the gentleman. At this time we will call our first and only panel. That's Dr. Donna Heivilin, Director of Planning and Reporting, General Accounting Office, accompanied by Mr. Kwai Chan, Director of Special Studies and Evaluation Group, and Dr. Sushil Sharma, Assistant Director of Special Studies and Evaluation Group. All three are at GAO.

[Witnesses sworn.]

Mr. SHAYS. For the record, all three have responded in the affirmative. Please be seated. I extended my apology to the committee for being late, and I would like to extend my apology to the three of you and to our guests as well. It is good to have you here today. And thank you. Dr. Heivilin, we're not going to put a clock on your testimony. This is just one panel. And by the way, we will be having the DOD and the VA come before us on Thursday, so I'm sure we will be hearing more about their view of your report. But

we want you to give your testimony, maybe not in its entirety, but almost.

STATEMENTS OF DONNA HEIVILIN, DIRECTOR OF PLANNING AND REPORTING, GENERAL ACCOUNTING OFFICE, ACCOMPANIED BY KWAI CHAN, DIRECTOR OF SPECIAL STUDIES AND EVALUATION GROUP, GENERAL ACCOUNTING OFFICE; AND SUSHIL SHARMA, ASSISTANT DIRECTOR OF SPECIAL STUDIES AND EVALUATION GROUP, GENERAL ACCOUNTING OFFICE

Ms. HEIVILIN. All right. Mr. Chairman, members of the subcommittee, I'm very pleased to be here today. Thank you for the invitation. I will submit the full statement for the record and I will summarize somewhat. I'll skip a few of the areas, like background.

In our work which we released yesterday, which was mandated by the 1997 National Defense Authorization Act, we addressed three issues. The first issue was the DOD and VA provisions for following up on the illnesses of the Gulf war veterans. The second, we looked into the coherence of the Government's research strategy. And the third issue we looked at was the consistency of key official conclusions with the available data on the causes of the Gulf veterans' illnesses.

I'd like to summarize our conclusions about those three issues and then provide a little more detail. First, regarding the first issue, DOD and VA have made no provisions to followup on the condition of the Gulf war veterans. We found neither DOD nor VA have any means of knowing whether the Gulf war veterans who are ill are better or worse off than when they were first examined.

As to the second issue, which is the coherence of the Government's research strategy, we believe that the Federal research has not been pursued proactively. Although health problems surfaced in the early 1990's, the vast majority of the research was only started in 1994 or later. And some will not be completed until the year 2000 or beyond. About 80 percent of it is still ongoing. The majority of the research—close to one-half—is focused on descriptive epidemiological studies as prevalence of cause. Little of the research is looking into effective treatments.

The epidemiological research is to determine the nature and cause of a particular illness. And the objective is to develop clues as to the treatment through building hypotheses and refining them and improving them. An example where this worked really well was research that was done into cholesterol, in which the researchers were able to relate higher blood levels of cholesterol to heart disease. And from there they went on to develop hypotheses and treatment for people who had high cholesterol so that their susceptibility would be lower in the future.

The problem, when we looked at the epidemiological research that's going on with the Gulf war veterans, is that there are scanty records on who was exposed to what, when, or on the vaccines or doses of drugs and amounts that were given to individual veterans. And their memories are unreliable or they may not have known what they were exposed to at the time that they were exposed. Consequently, it's quite likely that many of the epidemiological

studies will produce results that are inaccurate or difficult to interpret when they're finished.

Another large number of the studies—about a third of them—are pursuing the hypotheses that stress is a major contributing factor to the illnesses. We didn't find this research supportive of the Presidential Advisory Committee's conclusion that stress is a major contributing factor to the range of symptoms the veterans are reporting. And some hypotheses, such as symptoms are due to exposure to pesticides and chemicals used in the Gulf war, were initially funded only with private funds.

The bottom line is that not much of the research as currently being carried out is going to result in answers on how best to treat these illnesses. And it is unlikely to reveal the causes of the illnesses when the research is finished.

Our third issue drew the most controversy. We found the support for some official conclusions regarding stress, Leishmaniasis, and exposure to chemical agents was weak or subject to alternative conclusions. We believe you should not close the doors prematurely to causes without evidence. Six years after the war, we know little about the causes of the illnesses conclusively. The link between stress and the veterans' physical symptoms is not well-established. The prevalence of post traumatic stress disorder may be overestimated.

Leishmaniasis needs to continue to be considered as a possible future risk, since it can lie dormant for up to 20 years. And there is substantial evidence that organophosphate compounds, which were in pesticides used during the war and in chemical nerve agents Iraq possessed, might be associated with delayed or long-term health effects. A number of the veterans were evidently exposed to chemical fallouts. And although we have no evidence that they used it, Iraq had weaponized the biological agent aflatoxin, whose health effects appear years after exposure, generally in the form of liver cancer.

I would like to spend a little bit of time talking about the methodology we used in doing our research. To address the first evaluation question—whether DOD and VA had a way of following up and knowing whether the veterans were in better health now or worse health than they were when they were first examined—we reviewed the literature, agency documents, conducted structured interviews with DOD and VA officials. We asked some questions designed to identify and contrast their methods for monitoring the quality and outcomes of treatment and diagnostic programs and the health of the registered veterans.

For our second objective, which concerns the coherence of the research strategy of the Government, to answer the question we conducted a systematic review of pertinent literature and agency documents and reports. We also interviewed representatives of the Persian Gulf Veterans Coordinating Board research working group and officials of VA, DOD and the Central Intelligence Agency. We surveyed primary investigators—over 70 percent of them—who were doing the epidemiological studies.

And because of different methodology standards applied to various types of research and because of the overwhelming majority of

federally-sponsored researches categorized as epidemiological, we limited our survey to those responsible for those studies.

With the help of an expert epidemiological consultant, we devised a questionnaire which assessed critical elements of those studies, including quality of exposure measurement, specificity of the case definition, steps taken to ensure adequate sample size, and specific problems that the primary investigators may have encountered in implementing their studies.

We also reviewed and categorized descriptions of all 91 projects which were identified by April 1997, based on their apparent focus and primary objective. And finally, to review the progress of the major ongoing research efforts, we visited Walter Reed Army Institute of Research, the Navy Health Research Center, and two of VA's environmental hazards research centers.

On the third objective, we reviewed the major conclusions of the PGVCB and the Presidential Advisory Committee to determine the strength of evidence supporting their major conclusions. The purpose of this review was not to critique their efforts, per se, but rather, to describe the amount of knowledge about the illnesses that has been generated by research 6 years after the war. We reviewed these conclusions because they are the strongest statements that we found on these matters by any official body.

The Presidential Advisory Committee's report was significant because the panel included a number of recognized experts. It was assisted by a large staff of scientists and attorneys. And in addition, they conducted an extensive review of the research. Thus, we believed that evaluating those conclusions would provide important evidence about how fruitful the Federal research had been thus far.

We reviewed scientific literature and we consulted experts in the field of epidemiology, toxicology, and medicine. To ensure that the staff conducting this work had the appropriate backgrounds, we staffed this job with staff who had expertise in epidemiology, psychology, environmental health, toxicology, engineering, weapon design, program evaluation and methodology.

And in addition, using the process we have to bring in experts that we don't have assigned full-time on a job but whose expertise we can use when needed in conducting our research, we included experts from our organization who have expertise in chemical and biological warfare and military health systems. We also had medical experts review our work. And we had extensive discussions with experts in academia in each of the substantive fields relevant to the issue.

And finally, we talked to a number of authors of the studies that we cited in the report to ensure that we had correctly interpreted their findings. And we had independent experts review our draft report. In addition, we were in compliance with all of the general practices and policies that we have inside of GAO to ensure that we had quality assurance in doing our work.

I will now spend some time talking about the fact that DOD and VA have no systematic approach to monitoring the Gulf war veterans' health after the initial examination. Over 100,000 of about the 700,000 Gulf war veterans have participated in the VA and DOD examination programs. Nearly 90 percent have reported a wide array of health complaints and disabling conditions.

Most commonly reported symptoms are fatigue, muscle and joint pain, gastrointestinal complaints, headaches, skin rash, depression, neurological and neurocognitive impairments, memory loss, shortness of breath, and sleep disturbances. Officials in both DOD and VA claim that regardless of the illnesses, the veterans are receiving the appropriate treatment.

Both agencies have tried to measure and ensure the quality of their initial examinations through standards such as training that is given to medical physicians and the standards for physician qualification. However, these mechanisms don't ensure a given level of effectiveness for the care that is provided or permit identification of the most effective treatments.

We found they had no monitoring mechanisms for determining the quality, the appropriateness or the effectiveness of the care that they're getting after the initial examinations.

We believe such monitoring is important because undiagnosed conditions are not uncommon among the ill veterans, and treatment for the veterans with undiagnosed conditions is based on their symptoms. And veterans with undiagnosed conditions or multiple diagnoses may be seeing multiple providers. And without the followup, we cannot say whether these ill veterans are any better or worse today than they were when they were first examined.

The issue—I'll spend a little time now delving a little deeper into the second issue, which is that the Federal research strategy lacks a coherent approach. As I said earlier, we do not believe that the illness and the factors that might have caused the problems have been pursued proactively. And although the health problems began surfacing in the 1990's, the vast majority of the research was not initiated until 1994 or later.

Although many of the—we have about 91 studies ongoing—over four-fifths of them are not yet complete. And many of the results will not be available until the year 2000. We found that some of the hypotheses received early emphasis while some hypotheses were not initially pursued. The research on the exposures to stress received early emphasis. And research such as research on low-level chemical exposure was not pursued until it was legislated, in 1996.

The failure to fund some research cannot betray us to the absence of investigator submissions. There were proposals. According to the DOD officials, three recently funded proposals on low-level chemical exposure had previously been denied funds. And we found that additional hypotheses were pursued in the private sector. A substantial body of research suggests that low-level exposure to chemical warfare agents or chemically related compounds such as pesticides is associated with delayed or long-term health effects.

Regarding the delayed health effects of organophosphates, the chemical family that's used in many pesticides and chemical warfare agents, there is evidence from animal experiments, studies of accidental human exposures and epidemiological studies of humans at low-level exposures that certain of these compounds, including sarin nerve agents, to which some of the troops may have been exposed, cause delayed chronic neurotoxic effects.

It has been suggested that the ill-defined symptoms experienced by the veterans may be due in part to organophosphate-induced de-

layed neurotoxicity. This hypothesis was tested in a privately supported study. In addition to clarifying the patterns among veterans' symptoms by using statistical factor analysis, the study demonstrated that vague symptoms of the ill veterans are associated with objective brain and nerve damage compatible with the known chronic effects of exposure to low levels of organophosphates.

And it further linked their illnesses to exposure to a combination of chemicals, including nerve agents, pesticides, and flea collars, DEET, which is a roll-on insect repellant, and PB tablets. Toxicological research indicates that PB, which the Gulf veterans took to protect themselves against the immediate life-threatening effects of nerve agents, may alter the metabolism of organophosphates in ways that activate delayed chronic effects on the brain.

Moreover, exposure to combinations of these chemicals has shown in animal studies to be far more likely to cause morbidity and mortality than any of the chemicals acting alone. We found that the bulk of the ongoing research in the illnesses focuses on the epidemiological study of the prevalence and the cause of the illnesses. I discussed that earlier, so I will move on into some of the things that we have noted as challenges to the researchers who are conducting these studies.

First, as I said, they found it difficult to gather information about exposures to such things as oil well fire smoke and insects carrying infection. DOD has acknowledged that the records of the use of PB and vaccinations to protect against chemical and biological warfare exposures were inadequate. There is research going on right now to try to find the majority of the records, which seem to be missing.

Gulf war veterans were typically exposed to a wide array of agents. And it's difficult to isolate and characterize the effects of the individual agents or to study their combined effects. Most of the studies on the Gulf war veterans' illnesses have relied only on self-reports for measuring most of the agents to which they have been exposed. And it is difficult years after the war to be accurate and not to be biased about the recollection of what in fact they were exposed to during the time that they were over in the Gulf.

As a result, the findings from these studies may be spurious or equivocal. Classifying the symptoms and identifying illnesses of Gulf war veterans has been difficult. From the outset symptoms reported by the veterans have been varied and difficult to classify in one or more distinct illnesses. Moreover, several different diagnoses may provide plausible explanations for some of the specific health complaints.

It has thus been difficult to develop a case definition—that is, a reliable way to identify individuals with a specific disease. And this is a criterion for doing effective epidemiological research.

In summary, as I stated earlier, the ongoing epidemiological research will not be able to provide precise, accurate, and conclusive answers regarding the causes of the illnesses because of these formidable methological problems.

I'll move now to our last area of investigation, which was the support for key Government conclusions, which we found to be weak and subject to alternative interpretations. As I had mentioned, we looked at the conclusions drawn by the Presidential Advisory Committee because this is the major printed statement

about the Gulf war illness and the research that was being endorsed.

DOD endorsed the Committee's conclusions about the likelihood that exposure to 10 commonly cited agents contributed to the explained and unexplained illnesses of the veterans. We found evidence to support three of these conclusions either weak or subject to alternative interpretations. And I'll discuss those now.

First, the Committee concluded that stress is likely to be an important contributing factor to the broad range of illnesses currently being reported by the Gulf war veterans. But while stress can induce physical illness, the link between stress and these veterans' physical symptoms has not been firmly established. For example, a large scale federally funded study concluded that for those veterans who deployed to the Gulf war and currently reported physical symptoms, neither stress nor exposure to combat or its aftermath bear much relationship to their distress.

The Committee stated that epidemiological studies to assess the effects of stress invariably found higher rates of post traumatic stress disorder in Gulf war veterans than among individuals in nondeployed units or in the general U.S. population of the same age. Our review indicated that the prevalence of PTSD among the veterans may be overestimated due to problems in the methods they use to identify it.

Specifically, these studies to which the Committee refers have not excluded other conditions such as neurological disorders that produce symptoms similar to PTSD and can also elevate scores on the key measures of the PTSD. Also the use of broad heterogeneous groups of diagnoses in data from DOD's clinical program may contribute to overestimation of the extent of the serious psychological illnesses among the Gulf war veterans.

Second, the Committee concluded that it's unlikely that infectious diseases endemic to the Gulf region are responsible for long-term health effects on the forward veterans except in a small number of known individuals. Similarly, the PGVCB concluded that because of the small number of reported cases, the likelihood of Leishmania tropica as an important risk factor widely reported has diminished. While this is the case for observed symptomatic infection with a parasite, the prevalence of asymptomatic infection is unknown.

And such infection may re-emerge in cases in which the patient's immune system becomes deficient some time in the future. As the Committee noted, the infection may lie dormant up to 20 years in the human system. And because of this long latency, the infected population is a hidden population and even in classic forms of Leishmaniasis, it's difficult to recognize. We believe that it should be retained as a potential risk factor for individuals who suffer from immune deficiency.

Third, the Committee concluded that it's unlikely that the health effects reported by many of the veterans were the result of biological or chemical warfare agents, depleted uranium, or oil well fire smoke, pesticides, petroleum products, and PB or vaccines. However, our review of the conclusions indicated that while the Committee found no evidence that biological weapons were deployed during the war, the United States lacked the capacity to promptly

detect biological agents, and the effects of one agent, aflatoxin, would not be observed for many years. And this agent was weaponized by the Iraqis.

Evidence from various sources indicates that chemical agents were present at Khamasiyah, Iraq and elsewhere on the battlefield. The magnitude of the exposure to chemical agents has not been fully resolved. And as we recently reported, 16 of the 21 sites categorized by the Gulf war planners as nuclear, biological, and chemical facilities were destroyed.

However, the United Nations Special Commission found after that war that not all the possible NBC target had been identified by U.S. planners. The Commission has investigated a large number of the facilities suspected by the U.S. authorities as being NBC-related. And regarding those, the Commission has not yet inspected, we determined that each was attacked by coalition aircraft during the Gulf war. And one of these sites is located within the Kuwait theater of operation in close proximity to the border where coalition ground forces were located.

Also, exposure to certain pesticides can induce a delayed neurological condition without causing immediate symptoms. And available research indicates that exposure to PB can alter the metabolism of organophosphates. This is the chemical family of some of the pesticides that were used in the Gulf war as well as certain chemical warfare agents. The metabolism can be altered in ways that enhance chronic effects of the brain.

In our report we have three recommendations coming from the work that I have just described. First, because of the number of Gulf war veterans who continue to experience illnesses and that these illnesses may be related to their service in the war, we recommended that the Secretary of Defense and the Secretary of Veterans' Affairs set up a plan for monitoring their clinical progress so that we can help promote effective treatment, better direct the research agenda, and we also recommended they give greater priority to research on effective treatment for the ill veterans and on low-level exposures to chemicals and their interactive effects and less priority to further epidemiological studies.

We also recommended that the Secretaries of Defense and Veterans' Affairs refine the current approaches of the clinical and research programs for diagnosing PTSD consistent with suggestions recently made by the Institute of Medicine. The Institute noted the need for improved documentation of screening procedures and patient histories, including their occupational and their environmental exposures and the importance of ruling out alternative causes of impairment.

Mr. Chairman, this concludes my prepared remarks and Dr. Sharma and Mr. Chan will be happy to help me answer questions that you may have at this time.

[The prepared statement of Ms. Heivilin follows:]

Statement of Donna Heivilin, Director of Planning and Reporting, National Security and International Affairs Division

Mr. Chairmen and Members of the Subcommittee:

I am pleased to be here today to discuss the result of our study on the government's clinical care and medical research programs relating to illnesses that members of the armed forces might have contracted as a result of their service in the Persian Gulf War.[1] Our report responds to the mandate of the fiscal year 1997 defense authorization act. Specifically, I will discuss three issues: (1) the efforts of the Department of Defense (DOD) and Veterans Affairs' (VA) to assess the quality of treatment and diagnostic services provided to Gulf War veterans and their provisions for follow-up of initial examinations, (2) the government's research strategy to study the veterans' illnesses and the methodological problems posed in its studies, and (3) the consistency of key official conclusions with available data on the causes of the veterans' illnesses.

I will summarize our findings on the three issues we reviewed and then provide more detail. Regarding the first issue, although efforts have been made to diagnose veterans' problems and care has been provided to many eligible veterans, neither DOD nor VA has systematically attempted to determine whether ill Gulf War veterans are any better or worse today than when they were first examined.

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[1] Gulf War Illnesses: Improved Monitoring of Clinical Progress and Reexamination of Research Emphasis Are Needed (GAO/NSIAD-97-163, June 23, 1997).

On the second issue, we found that the majority of the research has focused on the epidemiological study of the prevalence and cause of Gulf War illnesses rather than the diagnosis, treatment, and prevention of them. While this epidemiological research will provide descriptive data on veterans' illnesses, methodological problems are likely to prevent researchers from providing precise, accurate, and conclusive answers regarding the causes of veterans' illnesses. Without accurate exposure information, the investment of millions of dollars in further epidemiological research on the risk factors (or potential causes) for veterans' illnesses may result in little return.

Regarding the third issue, support for some official conclusions regarding stress, leishmaniasis (a parasitic infection), and exposure to chemical agents was weak or subject to alternative interpretations.

BACKGROUND

Before turning to the results of our work in detail, let me briefly provide some background information and discuss the methodology we used for our study. During their deployment associated with the Persian Gulf War, many of the approximately 700,000 veterans of the Gulf War may have been exposed to a variety of potentially hazardous substances. These substances include compounds used to decontaminate equipment and protect it against chemical agents,

fuel used as a sand suppressant in and around encampments, fuel oil used to burn human waste, fuel in shower water, leaded vehicle exhaust used to dry sleeping bags, depleted uranium, parasites, pesticides, drugs to protect against chemical warfare agents (such as pyridostigmine bromide), and smoke from oil-well fires. Moreover, DOD acknowledged in June 1996 that some veterans may have been exposed to the nerve agent sarin following the postwar demolition of Iraqi ammunition facilities.

Many of these veterans have complained of wide array of symptoms and disabling conditions since the end of the war in 1991. Some fear that they are suffering from chronic disabling conditions because of exposure to chemicals, pesticides, and other agents used during the war with known or suspected health effects. Accordingly, both DOD and VA established programs through which Gulf War veterans could receive medical examinations and diagnostic services. From 1992 to 1994, VA participants received a regular physical examination with basic laboratory tests. In 1994, VA established a standardized examination to obtain information about exposures and symptoms related to diseases endemic to the Gulf region and to order specific tests to detect the "biochemical fingerprints" of certain diseases. If a diagnosis was not apparent, veterans could receive up to 22 additional tests and additional specialty consultations. In addition, if the illness defied diagnosis, the veterans could be referred to one of four VA Persian Gulf referral centers.

DOD initiated its Comprehensive Clinical Evaluation Program in June 1994. It was primarily intended to provide diagnostic services similar to those of the VA program and employed a similar clinical protocol. However, the VA program was among the first extensive efforts to gather data from veterans regarding the nature of their problems and the types of hazardous agents to which they might have been exposed.

METHODOLOGY

To address our first evaluation question--the extent of DOD's clinical follow-up and monitoring of treatment and diagnostic services--we reviewed literature and agency documents and conducted structured interviews with DOD and VA officials. We asked questions designed to identify and contrast their methods for monitoring the quality and outcomes of their treatment and diagnostic programs and the health of the registered veterans.

The second objective concerns the coherence of PGVCB's research strategy. To answer this question we conducted a systematic review of pertinent literature and agency documents and reports. We also interviewed representatives of the Persian Gulf Veterans Coordinating Board's (PGVCB)[2] Research Working Group and officials

[2]The PGVCB, comprised of the Secretaries of Defense, Veterans Affairs, and Health and Human Services, is charged with coordinating the federal response to Gulf War veterans' illnesses.

of VA, DOD, and the Central Intelligence Agency. We surveyed primary investigators of ongoing epidemiological studies.

Because different methodological standards apply to various types of research and because the overwhelming majority of federally sponsored research is categorized as epidemiological, we limited our survey to those responsible for ongoing epidemiological studies. With the help of an expert epidemiological consultant, we devised a questionnaire to assess critical elements of these studies (including the quality of exposure measurement, specificity of case definition, and steps to ensure adequate sample size) and to identify specific problems that the primary investigators may have encountered in implementing their studies. We interviewed primary investigators for 31 (72 percent) of the 43 ongoing epidemiological studies identified by PGVCB in the November 1996 plan. We also reviewed and categorized descriptions of all 91 projects identified by April 1997, based on their apparent focus and primary objective. Finally, to review the progress of major ongoing research efforts, we visited the Walter Reed Army Institute of Research, the Naval Health Research Center, and two of VA's Environmental Hazards Research Centers.

To address the third objective, we reviewed major conclusions of the PGVCB and the Presidential Advisory Committee on Gulf War Veterans' Illnesses to determine the strength of evidence supporting major conclusions. The purpose of this review was not

to critique PGVCB's or the Presidential Advisory Committee's efforts, *per se*, in this regard, but rather to describe the amount of knowledge about Gulf War illnesses that has been generated by research 6 years after the war. We reviewed these conclusions because they are the strongest statements that we have come across on these matters by any official body. The Presidential Advisory Committee's report was significant because the panel included a number of recognized experts who were assisted by a large staff of scientists and attorneys. In addition, the Committee conducted an extensive review of the research. Thus, we believed that evaluating these conclusions would provide important evidence about how fruitful the federal research has been thus far. We addressed this objective by reviewing extant scientific literature; and consulting experts in the fields of epidemiology, toxicology, and medicine.

Because of the scientific and multidisciplinary nature of this issue, we ensured that staff conducting the work had appropriate backgrounds in the field of epidemiology, psychology, environmental health, toxicology, engineering, weapon design, and program evaluation and methodology. In addition, we used in-house expertise in chemical and biological warfare and military health care systems. Also, medical experts reviewed our work. Moreover, we held extensive discussions with experts in academia in each of the substantive fields relevant to this issue. Finally, we talked to a number of the authors of the studies that we cited in this

report to ensure that we correctly interpreted their findings and had independent experts review our draft report.

Our work was completed between October 1996 and April 1997 in accordance with generally accepted government auditing standards.

DOD AND VA HAVE NO SYSTEMATIC APPROACH TO MONITORING GULF WAR VETERANS' HEALTH AFTER INITIAL EXAMINATION

Over 100,000 of the approximately 700,000 Gulf War veterans have participated in DOD and VA health examination programs. Of those veterans examined by DOD and VA, nearly 90 percent have reported a wide array of health complaints and disabling conditions. The most commonly reported symptoms in VA and DOD registries include fatigue, muscle and joint pain, gastrointestinal complaints, headache, skin rash, depression, neurologic and neurocognitive impairments, memory loss, shortness of breath, and sleep disturbances.

Officials of both DOD and VA have claimed that regardless of the cause of veterans' illnesses, veterans are receiving appropriate and effective symptomatic treatment. Both agencies have tried to measure or ensure the quality of veterans' initial examinations through such mechanisms as training and standards for physician qualification. However, these mechanisms do not ensure a given

level of effectiveness for the care provided or permit identification of the most effective treatments.[3]

We found that neither DOD nor VA has mechanisms for monitoring the quality, appropriateness, or effectiveness of these veterans care or clinical progress after their initial examination and has no plans to establish such mechanisms. VA officials involved in administering the registry program told us that they regarded monitoring the clinical progress of registry participants as a separate research project, and DOD's Clinical Care and Evaluation Program made similar comments. We believe that such monitoring is important because (1) undiagnosed conditions are not uncommon among ill veterans, (2) treatment for veterans with undiagnosed conditions is based on their symptoms, and (3) veterans with undiagnosed conditions or multiple diagnoses may see multiple providers. Without follow-up of their treatment, DOD and VA cannot say whether these ill veterans are any better or worse today than when they were first examined.

FEDERAL RESEARCH STRATEGY LACKS A COHERENT APPROACH

Federal research on Gulf War veterans' illnesses and factors that might have caused their problems has not been pursued proactively. Although these veterans' health problems began surfacing in the

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[3]See VA Health Care: Observations on Medical Care Provided to Persian Gulf Veterans (GAO/T-HEHS-97-158, June 19, 1997).

early 1990s, the vast majority of research was not initiated until 1994 or later. And much of this research was associated with legislation or external reviewers' recommendations. This 3-year delay has complicated the task facing researchers and has limited the amount of completed research currently available. Although at least 91 studies have received federal funding, over 70, or four-fifths, of the studies are not yet complete, and the results of some studies will not be available until after 2000.

We found that some hypotheses received early emphasis, while some hypotheses were not initially pursued. While research on exposure to stress received early emphasis, research on low-level chemical exposure was not pursued until legislated in 1996. The failure to fund such research cannot be traced to an absence of investigator-initiated submissions. According to DOD officials, three recently funded proposals on low-level chemical exposure had previously been denied funds. We found that additional hypotheses were pursued in the private sector. A substantial body of research suggests that low-level exposure to chemical warfare agents or chemically related compounds, such as certain pesticides, is associated with delayed or long-term health effects.

Regarding delayed health effects of organophosphates, the chemical family used in many pesticides and chemical warfare agents, there is evidence from animal experiments, studies of accidental human exposures, and epidemiological studies of humans that low-level

exposures to certain organophosphorus compounds, including sarin nerve agents to which some of our troops may have been exposed, can cause delayed, chronic neurotoxic effects.[4]

It has been suggested that the ill-defined symptoms experienced by Gulf War veterans may be due in part to organophosphate-induced delayed neurotoxicity.[5] This hypothesis was tested in a privately supported epidemiological study of Gulf War veterans.[6] In addition to clarifying the patterns among veterans' symptoms by use of statistical factor analysis, this study demonstrated that vague symptoms of the ill veterans are associated with objective brain and nerve damage compatible with the known chronic effects of exposures to low levels of organophosphates.[7] It further linked

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[4]Sarin has been used as a chemical warfare agent since World War II, most recently during the Iran-Iraq war, and by terrorists in Japan.

[5]R. W. Haley et al., "Preliminary Findings of Studies on the Gulf War Syndrome," Presentations to the Intergovernmental Coordinating Board for the Gulf War Illness and the Staff of the Presidential Advisory Committee on Gulf War Veterans' Illnesses," September 16, 1995; R. W. Haley, "Organophosphate-Induced Delayed Neurotoxicity," Internal Medicine Grand Rounds, University of Texas Southwestern Medical Center, Dallas, Texas, October 10, 1996; and G. A. Jamal et al., "The Gulf War Syndrome: Is There Evidence of Dysfunction in the Nervous System?" Journal of Neurology, Neurosurgery and Psychiatry, Vol. 60 (1996), pp. 449-451.

[6]This research, conducted at the University of Texas Southwestern Medical Center, has been supported in part by funding from the Perot Foundation.

[7]R. W. Haley et al., "Is There a Gulf War Syndrome? Searching for Syndromes by Factor Analysis of Symptoms," Journal of American Medical Association, vol. 277 (1997), pp. 215-222; R. W. Haley et al., "Evaluation of Neurologic Function in Gulf War Veterans: A Blinded Case-Control Study," Journal of American Medical Association, vol. 277 (1997), pp. 223-230; and R. W. Haley et al.,

the veterans' illnesses to exposure to combinations of chemicals, including nerve agents, pesticides in flea collars, *N,N*-diethyl-*m*-toluamide (DEET) in highly concentrated insect repellents, and pyridostigmine bromide tablets.

Toxicological research indicates that pyridostigmine bromide, which Gulf War veterans took to protect themselves against the immediate, life-threatening effects of nerve agents, may alter the metabolism of organophosphates in ways that activate their delayed, chronic effects on the brain.[3] Moreover, exposure to combinations of organophosphates and related chemicals like pyridostigmine or DEET has been shown in animal studies to be far more likely to cause morbidity and mortality than any of the chemicals acting alone.[9]

We found that the bulk of ongoing federal research on Gulf War veterans' illnesses focuses on the epidemiological study of the prevalence and cause of the illnesses. It is important to note

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[3]Self-reported Exposure to Neurotoxic Chemical Combinations in the Gulf War: A Cross-sectional Epidemiologic Study," Journal of American Medical Association, vol. 277 (1997), pp. 231-237.

[9]C. N. Pope and S. Padilla, "Potentiation of Organophosphorus Delayed Neurotoxicity," Journal of Toxicology and Environmental Health, vol. 31 (1990), pp. 261-273.

[9]M. B. Abou-Donia et al., "Increased Neurotoxicity Following Concurrent Exposure to Pyridostigmine Bromide, DEET, and Chlorpyrifos," Fundamentals of Applied Toxicology, vol. 34 (1996), pp. 201-222; and M. B. Abou-Donia et al., "Neurotoxicity Resulting From Coexposure to Pyridostigmine Bromide, DEET, and Permethrin," Journal of Toxicology and Environmental Health, vol. 48 (1996), pp. 35-56.

that in order to conduct such studies, investigators must follow a few basic, generally accepted principles.

First, they must specify diagnostic criteria to (1) reliably determine who has the disease or condition being studied and who does not and (2) select appropriate controls (people who do not have the disease or condition).

Second, the investigators must have valid and reliable methods of collecting data on the past exposure(s) of those in the study to possible factors that may have caused the symptoms. The need for accurate, dose-specific exposure information is particularly critical when low-level or intermittent exposure to drugs, chemicals, or air pollutants is possible. It is important not only to assess the presence or absence of exposure but also to characterize the intensity and duration of exposure.

We found that the ongoing epidemiological federal research suffered from two methodological problems: a lack of a case definition, and absence of accurate exposures data. Without valid and reliable data on exposures and the multiplicity of agents to which the veterans were exposed, researchers will likely continue to find it difficult to detect relatively subtle effects and to eliminate alternative explanations for Gulf War veterans' illnesses. Prevalence data can be useful, but it requires careful interpretation in the absence of better information on the factors

to which veterans were exposed. While multiple federally funded studies of the role of stress in the veterans' illnesses have been done, basic toxicological questions regarding the substances to which they were exposed remain unanswered.

We found that federal researchers studying Gulf War illnesses have faced several methodological challenges and encountered significant problems in linking exposures or potential causes to observed illnesses or symptoms. For example:

-- Researchers have found it extremely difficult to gather information about exposures to such things as oil-well fire smoke and insects carrying infection.

-- DOD has acknowledged that records of the use of pyridostigmine bromide and vaccinations to protect against chemical/biological warfare exposures were inadequate.

-- Gulf war veterans were typically exposed to a wide array of agents, making it difficult to isolate and characterize the effects of individual agents or to study their combined effects.

-- Most of the epidemiological studies on Gulf War veterans illnesses have relied only on self-reports for measuring most of the agents to which veterans may have been exposed.

-- The information gathered from Gulf War veterans years after the war may be inaccurate or biased. There is often no straightforward way to test the validity of self-reported exposure information, making it impossible to separate bias in recalled information from actual differences in the frequency of exposures. As a result, findings from these studies may be spurious or equivocal.

-- Classifying the symptoms and identifying illnesses of Gulf War veterans have been difficult. From the outset, symptoms reported by veterans have been varied and difficult to classify into one or more distinct illnesses. Moreover, several different diagnoses might provide plausible explanations for some of the specific health complaints. It has thus been difficult to develop a case definition (that is, a reliable way to identify individuals with a specific disease), which is a criterion for doing effective epidemiological research.

In summary, the ongoing epidemiological research will not be able to provide precise, accurate, and conclusive answers regarding the causes of veterans' illnesses because of these formidable methodological problems.

SUPPORT FOR KEY GOVERNMENT CONCLUSIONS IS WEAK OR SUBJECT TO ALTERNATIVE INTERPRETATIONS

Six years after the war, little is conclusively known about the causes of Gulf War veterans' illnesses. In the absence of official conclusions from DOD and VA, we examined conclusions drawn in December 1996 by the Presidential Advisory Committee on Gulf War Veterans' Illnesses. This Committee was established by the President to review the administration's activities regarding Gulf War veterans' illnesses. In January 1997, DOD endorsed the Committee's conclusions about the likelihood that exposure to 10 commonly cited agents contributed to the explained and unexplained illnesses of these veterans. We found that the evidence to support three of these conclusions is either weak or subject to alternative interpretations.

First, the Committee concluded that "stress is likely to be an important contributing factor to the broad range of illnesses currently being reported by Gulf War veterans." While stress can induce physical illness, the link between stress and these veterans' physical symptoms has not been firmly established. For example, a large-scale, federally funded study concluded that "for those veterans who deployed to the Gulf War and currently report physical symptoms, neither stress nor exposure to combat or its aftermath bear much relationship to their distress."[10] The Committee has stated that "epidemiological studies to assess the effects of stress invariably have found higher rates of

[10] R. H. Stretch et al., "Physical Health Symptomatology of Gulf War-era Service Personnel From the States of Pennsylvania and Hawaii, Military Medicine, vol. 160 (1995), pp. 131-136.

posttraumatic stress disorder (PTSD) in Gulf War veterans than among individuals in nondeployed units or in the general U.S. population of the same age."

Our review indicated that the prevalence of PTSD among Gulf War veterans may be overestimated due to problems in the methods used to identify it. Specifically, the studies on PTSD to which the Committee refers have not excluded other conditions, such as neurological disorders that produce symptoms similar to PTSD and can also elevate scores on key measures of PTSD. Also, the use of broad and heterogenous groups of diagnoses (e.g., "psychological conditions"--ranging from tension headache to major depression) in data from DOD's clinical program may contribute to overestimation of the extent of serious psychological illnesses among Gulf War veterans.

Second, the Committee concluded that "it is unlikely that infectious diseases endemic to the Gulf region are responsible for long term health effects in Gulf War veterans, except in a small known number of individuals." Similarly, PGVCB concluded that because of the small number of reported cases "the likelihood of leishmania tropica as an important risk factor for widely reported illness has diminished." While this is the case for observed symptomatic infection with the parasite, the prevalence of asymptomatic infection is unknown, and such infection may reemerge in cases in which the patient's immune system becomes deficient.

As the Committee noted, the infection may remain dormant up to 20 years. Because of this long latency, the infected population is hidden, and because even classic forms of leishmaniasis are difficult to recognize, we believe that leishmania should be retained as a potential risk factor for individuals who suffer from immune deficiency.

Third, the Committee also concluded that it is unlikely that the health effects reported by many Gulf War veterans were the result of (1) biological or chemical warfare agents, (2) depleted uranium, (3) oil-well fire smoke, (4) pesticides, (5) petroleum products, and pyridostigmine bromide or vaccines. However, our review of the Committee's conclusions indicated the following:

-- While the government found no evidence that biological weapons were deployed during the Gulf War, the United States lacked the capability to promptly detect biological agents, and the effects of one agent, aflatoxin, would not be observed for many years.

-- Evidence from various sources indicates that chemical agents were present at Khamisiyah, Iraq, and elsewhere on the battlefield. The magnitude of the exposure to chemical agents has not been fully resolved. As we recently reported, 16 of 21 sites categorized by Gulf War planners as nuclear, biological, and chemical (NBC) facilities were destroyed.

However, the United Nations Special Commission found after the war that not all the possible NBC targets had been identified by U.S. planners. The Commission has investigated a large number of the facilities suspected by the U.S. authorities as being NBC related. Regarding those the Commission has not yet inspected, we determined that each was attacked by coalition aircraft during the Gulf War. One of these sites is located within the Kuwait theater of operation in close proximity to the border, where coalition ground forces were located.[11]

-- Exposure to certain pesticides can induce a delayed neurological condition without causing immediate symptoms.

-- Available research indicates that exposure to pyridostigmine bromide can alter the metabolism of organophosphates (the chemical family of some pesticides that were used in the Gulf War, as well as certain chemical warfare agents) in ways that enhance chronic effects on the brain.

RECOMMENDATIONS TO DOD AND VA

Because of the numbers of Gulf War veterans who continue to experience illnesses that may be related to their service during the Gulf War, we recommended in our report that the Secretary of

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[11] Operation Desert Storm: Evaluation of the Air Campaign (GAO/NSIAD-97-134, June 12, 1997), p. 2.

Defense, with the Secretary of Veterans Affairs, (1) set up a plan for monitoring the clinical progress of Gulf War veterans to help promote effective treatment and better direct the research agenda and (2) give greater priority to research on effective treatment for ill veterans and on low-level exposures to chemicals and their interactive effects and less priority to further epidemiological studies.

We also recommended that the Secretaries of Defense and Veterans Affairs refine the current approaches of the clinical and research programs for diagnosing posttraumatic stress disorder consistent with suggestions recently made by the Institute of Medicine. The Institute noted the need for improved documentation of screening procedures and patient histories (including occupational and environmental exposures) and the importance of ruling out alternative causes of impairment.

Mr. Chairman, that concludes my prepared remarks. I will be happy to answer any questions you may have.

(713010)

GAO National Security and International Affairs Division

GULF WAR ILLNESSES

Improved Monitoring of Clinical Progress and Reexamination of Research Emphasis Needed

GAO Evaluation Questions

- How adquate are programs by DOD and VA to assess the quality of treatment and diagnostic services, and follow-up of treatment to Gulf War veterans?
- How coherent is the government's research strategy to study Gulf War illnesses?
- How consistent are official conclusions with available information on the causes of Gulf War veterans' illnesses?

GAO Principal Findings: Question One

- Neither DOD nor VA has systematically attempted to determine whether ill Gulf War veterans are any better or worse today than when they were first examined.

GAO Principal Findings: Question Two

- The vast majority of research was not initiated until 1994, and much of this research was associated with legislation or external reviewers' recommendations.
- Some hypotheses received early emphasis while others were not initially pursued. Additional hypotheses were pursued in the private sector. *(cont'd)*

GAO Principal Findings: Question Two *(cont'd)*

- Methodological problems are likely to prevent researchers from providing precise, accurate and conclusive answers regarding the causes of the illnesses of many Gulf War veterans.

GAO Principal Findings: Question Three

- Support for some official conclusions with respect to the causes of Gulf War illnesses, including the role of stress, leishmaniasis and exposure to chemical agents was weak or subject to alternative interpretations.

GAO Recommendations

- GAO recommends that the Secretary of Defense, with the Secretary of Veterans Affairs:
  - set up a plan for monitoring clinical progress of Gulf War veterans
  - give greater priority to research on treatments and low-level exposures to chemicals
  - refine diagnoses for PTSD

Mr. SHAYS. Thank you very much for your testimony. I'm struck by the fact that you broke a basic rule of investigators that are trying to get at the truth in this sense: An individual who is investigating political corruption in a community and determined that there were about 250 people who had been corrupted by the process of civil service, getting promotion, buying their way; he said he succeeded because in the end what he did was just went after one at a time. And the others hid behind the rocks. And then he tipped that rock. Finally, they realized that he was going after all of them, but by then it was too late.

You have had a very clear criticism of not just the VA but the DOD and the Presidential Advisory Commission on Gulf War Illnesses. I don't think you have many friends left in that community. And I'm concerned about it, frankly. But I congratulate you for your courage. And I know that your report will be thoroughly digested by many. In the end, I think that it will result in some significant progress. So I really am in awe of your courage, frankly.

In your statement on page 18—let me just say one more thing. It is no accident that this committee is the one that has had now our ninth hearing on Gulf war illnesses. And the reason is that we oversee the Department of Veterans' Affairs for waste, fraud, and abuse. We're not the statutory committee that provides legislation. We're not the appropriators.

I have found a tremendous reluctance in Congress on the part of the Armed Services Committee in the House and the Senate to thoroughly examine the DOD and its work because of the relationship that exists between that committee and the DOD. I have found a surprising reluctance on the part of the Veterans' Administration Committee to thoroughly examine what the Veterans' Administration has done. I have found a reluctance on the part of individuals to look at what the CIA has done, and, frankly, the Advisory Committee as well—the President's Commission. So this is a very refreshing opportunity for us to have you look at all three and point out some very, very serious problems with the work of these departments.

Now, on page 18 you talk about—actually it begins on 17. You talk about "evidence from various sources indicates that chemical agents were present at Khamasiyah, Iraq, and elsewhere on the battlefield. The magnitude of the exposures to chemical agents has not been fully resolved. As we recently reported, 16 of the 21 sites categorized by Gulf war planners as nuclear, biological, and chemical facilities were destroyed." And then you go on. "However, the United Nations Special Commission found after the war that not all the possible NBC targets had been identified by U.S. planners."

What do you mean first by that? What do you mean, had not been identified? There are more than 16?

Mr. CHAN. Let me try to explain the number system here.

Mr. SHAYS. Yes.

Mr. CHAN. One is the 21 targets that we're talking about, the sites. Those were the sites considered before the war as NBC targets. And I cannot talk about what the combination—how many of each. At the same time——

Mr. SHAYS. I'm not looking for a breakdown of nuclear, biological, or chemical.

Mr. CHAN. Right.

Mr. SHAYS. But there were 21 sites before the war.

Mr. CHAN. But in fact, what we did is found out after the war, that DOD had identified 34 so-called suspected sites where chemical weapons could have been either stored or placed somewhere. And it's with those 34 sites that we went to the CIA, the DIA, and UNSCOM to ask, how many of these sites had been inspected and what did they find in those sites.

It is through that process we found that not all the sites had been inspected by the United Nations. You don't want me to go through that litany over what happened, but——

Mr. SHAYS. Not all of the 34 sites?

Mr. CHAN. Right.

Mr. SHAYS. How many were inspected?

Mr. CHAN. Initially CIA told us a number.

Mr. SHAYS. They did not tell you a number?

Mr. CHAN. Yes, they did. But then they decided it's secret, classified, subsequently.

Mr. SHAYS. OK.

Mr. CHAN. So I cannot tell you how many were not inspected.

Mr. SHAYS. Right.

Mr. CHAN. Whereupon, they identified the sites. And since they obtained the information by UNSCOM they classified those uninspected sites as secret NONFOR. That means no foreigners can see it. So as a result, we went back to the U.N. and asked them to tell us. And they directed us to the DIA for that set of information. DIA, in turn, said, no, you're incorrect, CIA didn't tell you the accurate numbers—in fact, all 34 sites have been inspected.

Whereupon, they directed us to a specific person in CIA to confirm that fact. And we went back to CIA, and CIA sent us a memo saying, we stand by from our first letter that was sent to you, which was classified. So, we are left with two sets of information. And whereupon, I sent a letter to the U.N. asking them, listing all the sites and saying, to check the ones they inspected.

And they came out with a different set of numbers, which is a little more than the CIA, but confirmed, in fact, these were uninspected sites. So what I did is ask our own staff to investigate and look at the data in terms of bombing. In our own study for a different one we have over one point some-odd million pieces of data on every single bomb wherever it was dropped and when and so on. And we confirmed that those uninspected sites had been bombed by allied aircraft.

So as a result, we said, OK, then, why weren't they inspected if they were bombed and they were suspected chemical sites? Whereupon, United Nations basically said, you know, the inspection criteria is our own, not of the United States, which we accept. But in our report to you, in this report we issued today, basically, we just said that we left that issue open. Because we really don't know—one—whether there were, in fact, chemicals stored in that place. And we were disallowed in telling you where it is, because while we were told it was not really classified, per se, but, in fact, it's highly sensitive for people to know what it is. And so that's the language we arrive at in our final report. Did I answer your question? I'm just as confused.

Mr. SHAYS. Well, no. We're not going to be confused by the time we're done here. Maybe not today.

Mr. CHAN. OK.

Mr. SHAYS. Really, what you're describing to me is as blistering as your report appears to be, you left out a lot of very interesting information that needs to be examined.

Mr. CHAN. Yes.

Mr. SHAYS. And what you can say on the record—and we'll sort out the differences and what's secret and what isn't later—that originally we went in thinking there were 21 sites. We realized during the process of the war there were 34 potential sites. And that right now we do not have a clear picture as to how many of those sites were actually examined after the war. Is that correct?

Mr. CHAN. Right. And the United Nations basically agrees that some of these sites were not inspected by them.

Mr. SHAYS. And let me just say, so not only do we not know if all of them were done, we do know that some weren't.

Ms. HEIVILIN. Right.

Mr. CHAN. Right. Correct.

Mr. SHAYS. I mean that's fair. So therein lies the next Khamasiyah potentially.

Mr. CHAN. Right.

Mr. SHAYS. If any of them particularly were in the theater of the Kuwait battle. Now, were any of those sites in that theater?

Mr. CHAN. No. They were not.

Mr. SHAYS. None of those sites were?

Ms. HEIVILIN. In Kuwait? Was that your question?

Mr. SHAYS. Pardon me?

Mr. CHAN. They were not in Kuwait.

Ms. HEIVILIN. They are not in Kuwait.

Mr. CHAN. In Iraq.

Mr. SHAYS. No, but in the Kuwait theater.

Mr. CHAN. Oh, theater of operation. Yes.

Ms. HEIVILIN. Yes.

Mr. SHAYS. So in other words, our troops went outside of Kuwait, obviously. I care where our troops were.

Mr. CHAN. Yes.

Mr. SHAYS. Where our troops were, I call that the Kuwait theater.

Mr. CHAN. Theater of operation, yes.

Mr. SHAYS. Theater of operation. OK. Were any of those sites in that theater of operation?

Ms. HEIVILIN. Yes.

Mr. CHAN. Yes.

Mr. SHAYS. In addition to Khamasiyah?

Mr. CHAN. Yes.

Mr. SHAYS. Now, in Khamasiyah, the only reason that was known today was that a veteran actually who was there in the demolition team——

Mr. CHAN. Mm-hmm.

Mr. SHAYS. Because the difference in some of these sites is—that in some of these sites we bombed them and destroyed them that way.

Mr. CHAN. Correct. Yes.

Mr. SHAYS. So we were kind of a ways from it. Then the question was, which way did the plumes go? And we know they went in some direction. And we're pretty sure they didn't all go in the direction we originated before.

Now, the significance of Khamasiyah is, that that was the site where our soldiers actually went right up to it and laid the charges and blew it up.

Mr. CHAN. Mm-hmm.

Mr. SHAYS. And when they blew it up, some originally were 3 miles away or closer—much closer in fact—and as they blew this up they started to go farther away because you had artillery shells and so on going 6 miles and beyond. You had rockets that were going beyond the 6 miles. And you had a soldier who had pictures and identified the fact that this was also a chemical depo.

The reason why this information became public was that this soldier was invited to our hearing, had the video, had gone to the media, and was to testify on a Tuesday. On a Friday afternoon, at 4 o'clock after an announcement that the DOD would have an important announcement at 12—at 4 o'clock on a Friday afternoon—announced for the first time that our troops may have been exposed to chemicals—defensive.

Now, what's fascinating is that the CIA Director at the time had said that there was no offensive exposure to chemicals, which is a wonderful work that allows him to not be in violation technically of the law because the difference between offensive and defensive. We blew up this depo. Now, is your testimony that there were other chemical plants potentially or biological plants or depots in the Kuwait theater of operation that may not have been examined?

Mr. CHAN. Yes. But let me correct it. This is in regards to chemical sites only, not biological sites.

Mr. SHAYS. OK. A chemical site like Khamasiyah.

Mr. CHAN. Yes.

Mr. SHAYS. So the word is still out as to whether there's another Khamasiyah?

Mr. CHAN. I think one can draw the conclusion that we don't know what is there since it wasn't inspected. And our report states that we intend to address this question and find out the reason why.

Mr. SHAYS. Who intends to examine this question? I missed who he said.

Ms. HEIVILIN. We're still looking into it.

Mr. CHAN. It's an open question in our report that's incomplete. And this is a different report. And I left the language saying, there's an open question, we—implying GAO—will examine it, because it's open. I didn't want—it may be nothing, it may be something. And that's the implication.

Mr. SHAYS. OK. At this time let me call on Mr. Sanders.

Mr. SANDERS. There's so much to discuss and so little time. Mr. Chairman, let me briefly, before I ask our guests a question, let me briefly summarize something. And then I would like them to respond to it. The Presidential Advisory Committee ruled that stress is the likely cause of Persian Gulf illnesses and that chemicals and other types of exposure are likely not to have caused the problem.

Very briefly, let me read very short summaries of a number of studies.

Robert Haley, M.D., University of Texas: This research project that he did concluded that many veterans are suffering from three primary syndromes due to subtle brain, spinal cord, and nerve damage, but not distress. You dealt with—I know you talked to Dr. Haley.

Muhammad Abudonia, a Duke pharmacologist—his summary conducted on hens concluded that pyridostigmine bromide in combination with DEET and hermathrine cause neurological deficits in the test animals which are similar to those reported by Gulf war veterans. You've talked to him as well, I believe, or at least studied his work, right?

In 1995, the DOD published its own study which concludes, "There is a significant increase in the lethal effects in rats given pyridostigmine bromide, hermathrine and DEET simultaneously." You may have been familiar with that study, as well, right?

More recently, Dr. Abudonia conducted another research project. And this showed that when rats were given pyridostigmine bromide and then put in stressful conditions—which, God knows, is what existed in the Persian Gulf—pyridostigmine bromide was able to cross the blood brain barrier leading to suppressed ACHE levels.

Another study conducted by Friedman, Coffer, Shemer and others at the Hebrew University in Israel presents evidence that stress may make the blood brain barrier permeable to PB. Dr. Garth Nicholson, University of Texas, conducted research which indicates that many of the symptoms of Gulf war syndrome may be caused by chronic pathogenic microplasma infections.

Dr. Satu Somani, who testified before this committee, sat just where you do—he writes or tells us that "Experimental proof and historical evidence of symptoms such as impaired concentration and memory, headache, fatigue and depression of the workers who worked in the organophosphate industry with those considerations, I consider that illness associated with Gulf war veterans may be due to low-dose sarin exposure and intake of pyridostigmine and exposure to pesticides and other chemicals."

And on and on and on it goes. So my first question: Given what amounts to over a dozen different studies, how does the DOD, the VA, and the Presidential Advisory Committee continue to believe that stress alone is the cause of Persian Gulf illness?

Ms. HEIVILIN. That's the question we have also. And I don't think we really have an answer to why they continue to believe as they believe. Actually, what you're suggesting goes to the conclusion, and the recommendation we have that they move their research so that they are putting less emphasis on epidemiological studies and more emphasis on treatment and causes of the nature that you are suggesting.

Mr. SANDERS. I mean, are these researchers and the others, are they quacks? Are they dummies? Are they not held up in respect in the scientific community? Should we throw out all of that research, or is this useful research?

Mr. CHAN. Well, I think if I can go back to the PAC's comment to our report and also to their own report, which is one of the criteria that they use in selecting research articles that they examine

and include in their findings—in fact, peer review reports. And the list you have, many of them are, in fact—were peer reviewed. And so it does not satisfy the requirement why they were excluded. And I think if you look at on page 44 and 45, we list over a dozen-and-a-half different articles that we cite similar to what you have stated. And we found that at least there are plausible evidence that suggest otherwise.

I must add a quick comment in your question is that why we don't know the reasons why they included and excluded articles. It's certainly our criteria, our methodology is—is that when one draws these conclusions, one must ask, are there conflicting data and results out there? And when we found that, we try to reserve behind it and examine those information, speak with the authors and so on, make sure we didn't misinterpret their stuff, and ultimately raise the question is, when something is uncertain, we would leave that stone still assume is unturned. OK? And that's the way we approach it.

And maybe that's why we used the word "possibly" open for interpretation, because we did not try to attempt to see why some of these articles were excluded.

Mr. SANDERS. Thank you. One of the areas of frustration—and I think you make this point in your report—is that we have lost so much time.

Ms. HEIVILIN. Yes.

Mr. SANDERS. So much time. Let me mention something to you. And I would appreciate if you might comment. In 1993, in invited testimony before the Subcommittee on Oversight and Investigations of the Committee on Veterans Affairs, Dr. Claudia Miller, who is at the University of Texas, called for a specialized research facility, an environmental medical unit, in order to test scientifically whether ill Gulf war veterans were sensitive to very low levels of common chemicals, as many of them were reporting.

Although congressional appropriations for half the cost of the facility were obtained through a bipartisan effort and DOD agreed to fund the remainder, DOD failed to implement the project. No such research facility currently exists that would allow physicians to diagnose or rule out chemical sensitivity in the veterans.

She came forward with this proposal which received initial approval in 1993. This is 1997. We still have not even done that. Would you want to comment on that?

Ms. HEIVILIN. Well, it's impossible for us to audit or to evaluate and know precisely the motivations of people. What we look at—and that's what you're telling us about—is we look at the actions and we look at the programs and we look at the results of those actions and programs. And again, when we looked at the research, we found that the research was very heavily focused in a couple of areas and there was very little research going after the kinds of things that you've just been describing to us.

As to what the motivations were for the agencies in doing what they did do, we really can't attest to that.

Mr. SANDERS. OK. Now, I'm going to ask you a really hard question. I think one thing—you know, as I've said a million times, this chairman over here is responsible for as many of the breakthroughs as any Member of Congress, and I'm delighted to serve

with him. And I think what neither he or I or any other member of this committee wants to do if we come back here is 2 years and 4 years from now go over the same discussion again, and beat up on the DOD and beat up on the VA and so forth and so on.

Ms. HEIVILIN. Mm-hmm.

Mr. SANDERS. Now, I personally—and I speak only for myself—have reached the conclusion that for whatever reason—and we can speculate something, for example, that there is reluctance for the DOD to go forward in this area because they, in fact, administered, among other things, pyridostigmine bromide. Right? And we all know that nobody ever intended to do any harm to our own people. There's no question about that.

But if they are the folks who administered pyridostigmine bromide to hundreds of thousands of vets, there may in fact be consciously or unconsciously a reluctance to go forward, which might suggest that that drug in combination with other chemicals may be part of the problem.

Whatever the case may be, do you think, based on your analysis, that DOD and VA are in fact capable of getting to the root of the problem, capable not only of giving us an understanding of the cause of the problem, but of developing, more importantly, a treatment? One of the frustrations that many of us have had—we want treatments. Maybe not all the treatments will work. But I have mentioned, and others know of, different treatments out there which might be experimental.

When I talk to veterans who are hurting, they say, hey, give us a shot at it, maybe it works, maybe it doesn't work. But why don't we have the opportunity to take advantage of those treatments?

Now, I have reached the conclusion that the DOD and VA, for whatever reason, are not going to be able to do the right thing. Do you want to give us your view? Do you think that they're capable? Should we continue to go forward with them or look or other agencies?

Ms. HEIVILIN. We're certainly not seeing evidence of a nature that says that they're moving out smartly on these issues. Maybe as an example in a related area—there were two other reports we did as a result of this mandate in the armed services legislation last year. And one of them was to look at what the progress was in coming up with vaccines or anti-agents for future chemical and biological agents that our soldiers, sailors, and airmen might encounter in the future.

It's a classified report, but I'll talk about what I can in an unclassified way. Basically, we looked at all of the known biological agents held by nations that we could possibly go to war with or that are unfriendly with us, not only that hold, but ones that could be quickly produced. And we looked at where DOD was in having FDA approved drugs—investigational drugs—and only something in R&D.

And in the last few years, there has been absolutely no progress. Over a number of years, there has been no progress. We made a recommendation that they move out smartly, so to speak. And they agreed with us. But as I said, there's been no progress over the last few years.

Mr. SANDERS. Mr. Chairman, I'm going to stop speaking here in a moment.

Mr. SHAYS. You have the floor.

Mr. SANDERS. Oh, I have the floor. Let me just say this, Mr. Chairman. You know, when a coach on a basketball team or a manager on a baseball team continues to produce a losing record, we can sit down and talk to the coach or the owners of the team sit down and talk to the manager, but finally at a certain point you make the conclusion whether that individual is capable of doing the right thing for his team.

Well, we are the owners of this team. And we have an obligation to tens and tens of thousands of men and women who put their lives on the line defending this country to do the right thing by them. And I have concluded, not with a great deal of happiness, that, for whatever reason, the VA and the DOD are not going to do the right thing.

I think it is a waste of our time to keep kicking and prodding and pushing and questioning them. We can do that for the next 20 years. I think ultimately we have got to conclude that there are some serious researchers out there, some people with minimal research who have done some cutting edge work. There are perhaps institutes within our own Government, such as the National Institute of Environmental Health Sciences, who want to go forward.

I think other Members of Congress share our frustration. I would think that the best thing that we can probably do right now is conclude that the DOD and the VA are not going to do the right thing, for whatever reason, find people in Government and in the private sector who can work together on an emergency basis. One of the frustrations that I've had—and I think I hear that from you as well—is that there is no sense of urgency.

Studies come out which indicate something. And what's the plan? "Well, we'll continue to do studies. And maybe in 5 years we'll have another study."

Where does it end? Where are the—unless I am missing something, Mr. Chairman, one would have thought that after all of this time, we would be hearing reports of a dozen different treatment protocols, some of which may be working, some of which may not be working. Right? It seems to me what we would have been hearing if one believed that there was a sense of urgency.

And I don't think that the DOD or the VA have that feeling. So I think we owe it to work with our colleagues in the House to go outside of the DOD and VA, develop a sense of urgency, get some funding, get some time lines for those people who are willing to look at many of the questions that the GAO have asked. And I just, at this point, want to thank all of you. Yes, Mr. Chan?

Mr. CHAN. Let me give a different perspective. I think so far what we have been discussing may be sort of half of the pie and not the entire thing. And I'm sensing that a lot of the criticisms that we're making on the health research, they are what scientists call systematic, deliberate, bring the evidence forward and arrive at some conclusions.

And that's a very noble approach to solve a problem. The trouble that we're seeing that when you have multiple agents with mixes that everybody agrees, to solve the factorial answer, what are the

various combinations without knowing the dose response and all that stuff, we're saying that, basically, you can't take step 1 to 2 to 3 to 4, but you may have to jump over the hoop of No. 3 because we cannot establish cause and effect.

Now, it's the paradigm you go through to examine these things in that light. And what a lot of the official agency's comment was, we have not seen evidence of this, so, therefore, we don't do the research. Now, there's a different side of that pie, which is pushing without much debate, is, in fact, what exactly happened in that war? What are the operational possibilities? What is it that the enemy, the Iraqis, what they could have done? Could they have used chemicals? Could they have used biological?

And it suggests something a little different. Now, one can take that and say, let's make that assumption and move ahead with research rather than re-examining potential—we need the existence of such things before we go and prove cause and effect. And I think what we are hearing—myself, anyway—from the veterans, is that, "I was there. I saw the depleted uranium being hit and burned and so on."

Well, one can take that and say, well, there may be 10 cases or none, I don't know. But why can't we just take that and fire the weapon, see if, in fact, the smoke can have particles like that, see if, in fact, there's a health effect as a result of toxic exposure, rather than saying, well, we found only a handful and it's not showing up in the health status of these people right now, without really due consideration on how well the protocol is in determining whether they're really sick of those things.

So you have sort of a mismatch that, I think—it's very difficult to—I don't think that the DOD and the VA—I think that they're doing the best kind of research they can given the evidence, but I think they're using very strict criteria and research at arriving at those conclusions. So you may be right. And our concern is, if you can't jump these hoops, then maybe we'll never get there.

Mr. SANDERS. That's right. And let me just mention something. Again, I say this as somebody who is not a scientist. And I defer to you with your scientific backgrounds. A couple of months ago, sitting right up there was a gentleman named Major Donnelly from Connecticut, I think. And we heard a very sad and tragic story. And he is ill with Lou Gehrig's Disease right now.

And one of the things that he said which moved me is that he said that his symptoms became exacerbated—if my memory is correct—when he was out jogging at a military base and they were spraying for pesticides. It was triggered. Again, I'm not a scientist, but that does tell me something that we might want to investigate.

I went home, and last month we had a conference in Vermont, in the State of Vermont, which we focused on Persian Gulf illness—and Bob Newman, by the way, of your staff, was there and did a wonderful job in speaking to our vets about what he knows about the problem. And I was in the room with about 15 vets in my small State who are hurting. And I asked him a very simple question. I said, tell me something, when you go out into unfriendly environments, do your symptoms flare up?

Very simple question. I'm not a scientist. One guy said—he started laughing, because his wife was sitting next to him. He said, "Yeah, whenever my wife puts on perfume I get sick."

OK? Another guy says, "Yeah, I used to work in a service station. I was a mechanic. I can't work around fuel anymore. The fumes from fuel get me sick."

Another guy said—no offense to anybody from New Jersey—"I was in New Jersey recently, around the petrochemical plants, and I got really sick when I was exposed to that."

Almost everybody in the room said that their symptoms flare. And what got me, and really concerns me is, I'm wondering tens of thousands of men and women who were over there are full of these toxins right now who could at least be helped if we could avoid—maybe this type of pesticide in your food may make you more ill. I don't know.

But to get back to your point, Mr. Chan. I think those are the questions that need to be pursued. We also learned in some of the studies that I indicated—there are at least two studies that now indicate—Dr. Haley being one—that there may be actual neurological damage. All right. Now, that is something that is pretty definitive, right? If somebody has neurological damage, why aren't we testing now 10,000 people to see if there's neurological damage and if it correlates to what we call Persian Gulf illness? Mr. Chan.

Mr. CHAN. Well, I think the DOD comment about that study is that it's sample size is small, it's not generalizable and so on. And I thought that when DOD responded that way, I thought, well, then replicate it.

Mr. SANDERS. Exactly. If it's too small a study then do a big study.

Mr. CHAN. If it cannot be, then we end up proving the case. I don't understand that. In a logical way of research, there's a hypothesis. And maybe it's localized to that particular unit.

Mr. SANDERS. Right.

Mr. CHAN. And in fact, because of their movement, they were exposed to something entirely different while another group may have totally very healthy groups. I don't know.

Mr. SANDERS. And in Great Britain there was also another study which indicates neurological damage. Isn't that correct? It would seem to instead of criticizing——

Mr. SHAYS. You asked him a question.

Mr. SANDERS. OK. You think I should give him a chance to answer the question I asked him? OK. Why not?

Mr. CHAN. Someone behind me wants to answer the question?

Mr. SANDERS. No. You.

Mr. CHAN. I just said that, you know, the idea of epidemological studies is really to generate new hypotheses and so on. And I have no doubt their limitations in a very small study that you refer to. And our own team basically said, instead of rejecting, let's try it out somewhere else. And it may work, it may not work. That's the approach I think we've been taking in regards to this report.

Mr. SANDERS. Thank you very much.

Mr. SHAYS. I thank the gentleman. We're going to be coming back again. But Mr. Sanders has been an early and active participant in these committees and really has been an equal partner

with me in this effort. There's no Republican or Democrat in this process. Mr. Sanders, thank you. And Mr. Allen, you have been extraordinarily patient. And I appreciate it very much.

Mr. ALLEN. Thank you, Mr. Chairman. I appreciate the chance to be here and hear what you have to say. And I'm pleased with the direction this conversation is going right now. Because I think we need a paradigm shift here. So many people think about diseases or symptoms as being caused by a single agent. There's a virus, there's a bacterium, and it produces the same kinds of symptoms in particular people. And you figure out the causation. You figure out the appropriate treatment. And the treatment works for everyone. But what we have with the Gulf war syndrome, what we have with the illnesses that are reported are a wide variety—almost 700,000 people went there. They were exposed to different chemical and biological agents at different times. And in their subsequent life, they come in contact with—whether it's perfume or insecticide or whatever it may be—other kinds of chemicals that may set off a chain reaction.

So in this case, the complicating factor, it seems to me, is that every case is somewhat different from every other case. And until we recognize that and accept it, we are going to be in trouble. And that's why I thought, Mr. Chan, your suggestion for research. You know, even if you have only a few cases, we're not looking for one common cause here. That's not what these studies are about. We're trying to figure out a combination of causes that may have certain kinds of effects, and then get to the basic point, which is how do we help the veterans who are suffering through these illnesses.

So what I would like to do is to talk for a minute about your recommendations, particularly the first two recommendations. Where do we go from here? And setting aside for a moment Mr. Sanders' suggestion that we just give up on the VA and the Department of Defense, let's look at—someone's got to do this. And one of your recommendations is that DOD and Veterans' Affairs set up a plan for monitoring the clinical progress of Gulf war veterans. Can you take that a step further?

I mean, we have hundreds of thousands of veterans out there being treated by doctors all around the country. How do we manage this? What steps would you take to implement that recommendation?

Ms. HEIVILIN. I think that in responding to that, the VA, particularly, thought we were asking for a much more complicated system than we were asking for. But recognizing just what you said, not all of them are being treated in either DOD or the VA. It would require that you have some system for maybe statistically sampling. Or, if you think we need to get larger numbers in the group, going to all of them for periodic examinations, collecting information on how they're being treated, and whether in fact they're getting better or not. And if you had information on their symptoms and their treatment, and if they're better or not, you could then do some comparison.

You could go into the data base and pull out clusters of people that have the same symptoms, look to see if they're being treated the same way and if they're better, and you may identify from that some treatment that is working better than other treatments for

certain set groups of symptoms. We're not asking—at least initially—for anything really complicated.

But it would require a system for doing that. It would require that we get information from each of the people who have registered—maybe from their doctors—or have them fill out a form, periodically on what I said—follow up on what the symptoms look like, are they better or worse, and what treatment are they getting. And then we can do some comparison, some studies.

Mr. ALLEN. So if I understand what you're saying, you're not saying you have to look at all 700,000, but you try to cluster some symptoms and look at groups that have similar symptoms and then try to work from that base? Is that fair?

Ms. HEIVILIN. Yes.

Mr. CHAN. Right now, with all the information, it looks like a sort of a randomized trial going out there—everybody treating everybody and not knowing any results. And some people may go outside the system and go to private physicians for the information. The illness analysis is not the illnesses but the individual. OK? That's what you're looking for.

And then the question is, what are the combination of illnesses they have. Not that she has headaches and I, in the control group, also have headaches. But she may have multiple symptoms which I don't have, but somebody else has. Let's say, joint pains and so on. The question becomes, if they are being treated symptomatically, what is working out there? What is not working? How do we make sure that in fact that can be shared among others and so on? What's the right way to do that?

I don't think we know if there are multiple symptoms out there—then there's no magic bullet to solve these things. But if it's going on already—they're being treated—it seems like it's one way to capture the information by which one can determine other successes that would be helpful for others.

I think we sort of start off thinking not very ambitiously how this is. And I must say I was quite disappointed by the agencies' disagreement with these particular points.

Mr. ALLEN. Let me turn to the second recommendation. You suggest we should give greater priority on research on effective treatment for ill veterans and on low-level exposure to chemicals and their interactive effects, and less priority to further epidemiological studies. Can you talk to me a little bit about the epidemiological studies?

I mean, they're designed to try to figure out causation. That's partly what we're talking about. But is it because those studies, you feel, have been on the wrong track? You said earlier that one-third of them have been related to stress, which, in light of everything that was going on out there, you can understand. But that does seem overweighted.

What kinds of research are you recommending that is different from the kinds of studies that have been done before and would be focused on effective treatment for veterans and on dealing with these low-level exposure to chemicals kinds of issues?

Ms. HEIVILIN. Well, first, the epidemiological studies—you were asking about the problem with them. And I'm going to separate them from the stress studies. The epidemiological studies, the pri-

mary problem, because they're descriptive, is trying to figure out what the symptoms are and figure out the causes related to the exposures that the soldiers and sailors and airmen had. The problem is that the data is not accurate. The records from the Gulf on who took what vaccine when and who took what drug when is scanty.

The records about exposures is scanty, also. And when you try to rely on memories of people who have been there and you start asking them, say, 4 years after it happened there are problems. I was there a month after the war and if you asked me exactly where I was on any particular day, I'd have to go back to my diary and hope that I had noted where I was and then try to remember what I was exposed to. But I'm sure I don't know what I was exposed to. I have maybe a little idea. But I wouldn't even know if there was something in the air some place I was, other than if I had happened to be in Kuwait, which I wasn't, I was hearing people talking about how bad the air was up there when they were up there because of the oil fires.

But that is what is, in our minds, resulting in or going to result in epidemiological studies that will have very little use, because we'll have a lot of questions about the accuracy of the conclusions.

The other group was the stress, and we had different—looking at stress is a primary focus, and we have problems with other things in looking at stress. Then your other issue was, what kind of work——

Mr. ALLEN. What next. Where should we go?

Ms. HEIVILIN. I don't think we're recommending that they stop the funding of anything that's ongoing. What we're suggesting is that they shift the future funding in this area to studies that will do something like what we were describing for tracking the wellness or the illness of the veterans who were exposed. We could use that data and then pull out—hopefully there would be clusters of symptoms of people that are experiencing better health than other people with the same symptoms, and take a look at what kind of medications, what kind of treatments they're getting. That would be one set of the studies.

Then the other set would be looking at and experimenting, probably with animals, on what is the effect of some of the combination of chemicals that were being experienced by some of our people that were over in the Gulf. There is the possibility of using accidental exposures, if, in fact, that data is available for human beings. There's always the problem that accidental exposures may not be and probably isn't exactly like the exposures that the veterans experienced, and they may not have all of the combinations. So animal research is probably the area that we have to move into.

Mr. ALLEN. Just going back to your first recommendation. Shouldn't we have a major outreach effort? One of the things that strikes me is, when we had Major Donnelly here, who said, it acts up when we go out and go running. And it was a base down in Texas where they had just sprayed for mosquitoes, I think he was saying——

Ms. HEIVILIN. Mm-hmm.

Mr. ALLEN. There may be a lot of veterans who suffer symptoms who don't have a clue what the cause is. And they might be helped by some sort of outreach effort that said, look, you were in the

Gulf, a lot of people have experienced certain kinds of symptoms—here are the kinds of things that may set off, that may have ill effects on you that you would never attribute to your past exposure. But for example, whether it's pesticides, whether it's perfume, whether it's something.

So that some of the veterans who are out there—and they may not have even gone to a doctor yet. They just know that sometimes they feel lousy and they don't know why they feel lousy. But it would be a way to call their attention to things in their environment that might help them.

Ms. HEIVILIN. I think the more we can do of that nature, the better. We had some concerns. And we did write about it in the report that the registry is likely to not be complete. Some of the people who are on active duty might not want to register because they think that might affect their efficiency rating or the way they're looked upon by their superiors.

There might be other people that say, I just don't want to do it. I'll go to my own private doctor. I don't trust whoever. It's not going to do anything for me. But Dr. Sharma, I would like to invite you to comment a little bit more about the research that we were talking about.

Mr. ALLEN. Yes.

Mr. SHARMA. Let me first answer your question about the first recommendation. We find it quite interesting that on the one hand we hear that the DOD and VA really don't know what caused this illness. The purpose of the Federal research strategy is to identify the natural course of the disease or diseases that veterans are experiencing. Now, how do you study the natural course of the disease? Obviously, you follow the patient over time to ascertain, whether they are getting better or worse. Whether should we do it through a research project or through the research that they're getting, the fact of it is, the veterans are ill, they are receiving treatment—some of them from the VA system, some of them from the Federal system and DOD system, others are going on their own. That's not the issue. The issue here is, those people who are within the system, do we know are they better or worse? And if we do monitor their clinical progress, not only will we have some clues about what made them better or worse, but also it will provide us some understanding of the natural course of the disease.

During the war, veterans were exposed to multiple agents. We will never be able to figure it out—to what and at what level and for how long. But at least we can then try to follow, try to understand whether they're getting better or worse.

Now, as far as your second point is concerned about the type of research, VA, in particular, seemed to be making a point of clinical trial. And I wanted to re-emphasize here, we are really not talking about clinical trials.

We are not talking about—veterans are not receiving treatment that are unproven therapies. They are receiving symptomatic treatment for something very specific, whether it be tension headaches or joint pains or whatever. The issue here is: are those traditional, proven therapies working on them? If they are not working, then that suggests something, that perhaps it is something very unique.

It's not a common tension headache. Perhaps it's not a common gastrointestinal problem. This is something very unique.

We seem to find this wall that from the VA's side that "This is the protocol. This is the only way one could study." We find this very difficult to accept. What we are proposing is something very simple, something very logical, something that's not going to cost a lot of money, something that most health care providers should be and must be interested in—finding out whether, as a result of their clinical services, are people getting better.

Mr. ALLEN. Mm-hmm.

Mr. SHARMA. This is an issue of accountability. What are we doing? As a result of our efforts, are we being responsive to the public or not? That's the very simple issue that we are addressing here in this recommendation.

Mr. ALLEN. Thank you very much. Mr. Chairman, I have one more question. I just wonder if we're doing any better in Bosnia in terms of recording what chemicals our troops may be exposed to over there. Because, although it's not the same situation, it seems to me something to think about, something to deal with.

Ms. HEIVILIN. We've looked at whether they're doing a better job on the records of what kind of medicines and what kind of vaccines the troops are getting in Bosnia than they did in Saudi Arabia. And it is better, but it's not good enough. And we have a report that we put out May 13 that discusses that.

Mr. ALLEN. Good. Thank you very much. Thank you, Mr. Chairman.

Mr. SHAYS. I thank the gentleman very much for his questions. I'm trying to sort out a few issues and have them a part of the public record. And I think I'd like to go back to where Mr. Sanders was just a bit. In the third hearing, on June 25, 1996, Dr. Stephen Joseph appeared before us. Now, he is now the former Assistant Secretary of Defense for Health Affairs.

And one of the points that he made that just rings in my ear—because it seems to me if you have this philosophy, then you're really not going to go into a certain room that you need to go into. He said, "The most important thing that I really have to say about this is that the current accepted medical knowledge is that chronic symptoms or physical manifestations do not later develop among persons exposed to low levels of chemical nerve agents if they did not first exhibit acute symptoms of toxicity."

Now, in your statement you rightfully point out that the Congress—that basically, support for some—in your report, you point out that we didn't look at low-level exposure to chemicals until 1996, when it was mandated by Congress to do that. So before then, there was simply no work done by the DOD or VA.

Now, the VA accepted the fact—wrongly, but accepted the fact—that the DOD was correct when they said our troops weren't exposed to chemicals. But even if they thought they might have been exposed to low levels of chemicals, it was the person in charge of health affairs for DOD who said that basically there's no accepted medical knowledge that chronic symptoms or physical manifestations do not later develop among persons exposed to low levels of chemical nerve agents.

Now, in my work as a State legislator, one of the most active things we did in the State legislative bodies was to deal with environmental chemicals in the workplace. And we were very strict in not allowing businesses to expose their workers to low-level chemicals because we felt, based on medical science, that low-level exposure over time results in serious illness.

Have you all examined this issue in any way, and if so, would you respond to it?

Mr. SHARMA. We looked at, first of all, the Federal research protocol, and we found that indeed there were at least three proposals that were submitted prior to 1996 but were not funded. And the argument that was given to us at the time was, because obviously they were not aware of Khamasiyah, and since there was no exposure, what's the point of studying or funding those studies.

The second thing was that the research evidence is not as clear-cut. If you take a look at the PAC report—the research they have cited—and the research that we have cited, we have an interesting finding. For whatever reason, the research that we looked at, that we examined, which was peer-reviewed, very clearly suggests—and based on that we have concluded that there's substantial evidence that animals exposed to low levels of chemicals do exhibit symptoms that are very similar to the kinds of symptoms that Gulf war veterans are experiencing.

Now, one of the criticisms that the agencies had about this type of research after we sent them the draft—"Well, you can't extrapolate those results from animals to humans." The fact is the symptoms are very similar to Gulf war veterans. Obviously there are some ethical issues. You cannot do that kind of research on human beings knowing that exposures have very adverse effects. So you have to follow the next best model.

Can you learn something? We have some evidence from accidental exposure research. Indeed, DOD had some funded——

Mr. SHAYS. Did you look specifically at the basic principle that was exposed by Mr. Joseph that said that current acceptable medical knowledge is that chronic symptoms of physical manifestations do not later develop among persons exposed to low levels of chemical nerve agents?

That's the question I'm really asking. That was the guiding principle that basically let the DOD say, "We're not going to look."

If people weren't literally dying on the field, then they weren't exposed to chemicals in any serious way. And if they were exposed to low-level chemical exposure it's meaningless. Now, I'm just interested to know if you got into this issue. Did you all start with the premise that low-level exposure is serious or not serious? Enlighten me a little bit here.

Ms. HEIVILIN. I think we started with the premise that nothing should be ruled out unless you had conclusive evidence that it wasn't important or that it was not something that happened.

Mr. SHAYS. OK. So what we have in testimony before our hearings is that soldiers said continuously that alarms went off, detecting some level of chemical exposure. Now, DOD will tell you that all of them were false alarms. All of them. That they were all false alarms. The Czechs are the only ones who seem to have some credibility in terms of their detection and because of their followup.

We had individuals who were in the FOX vehicle with the better equipment who came in, said they detected it. And DOD minimizes and totally refutes the testimony of their own soldiers who were trained. Now, the bottom line is that the DOD has said from day 1 that, in essence, if you didn't have acute symptoms, if they didn't see people drop on the battlefield because of chemical exposure, they really weren't exposed to any serious chemical exposure because low level doesn't result in serious illness in the future.

That is one hell of an assumption to me. Now, we have soldiers who come and testify that tell us why animals were just dead all around with no insects on them. And when we had veterans who came and testified of actually having the alarms go off and going into a bunker, then being told they can come out of the bunker. They come out and there's a mist in the air, they start coughing up blood, throwing up—except those who had the protective gear still on—and they went right back into the bunker.

They're being told later by the DOD that they weren't exposed to chemicals. And one of the feelings that I get from your report is, listen to the veterans. The veterans, as far as I'm concerned, have been voices in the wilderness with no one listening. So I'd like you to just comment on that whole area.

Ms. HEIVILIN. We've heard some of the same stories you have. And important to this area, we have a request that we're looking at from the House Veterans' Affairs Committee to look at the lost records, the lost documents known as CINCCOM NBC logs. Most of them have not been found. What we've found in going after that question is that the Defense Criminal Investigative Service is conducting a major investigation into the whereabouts and the handling of these logs, which would be an important piece of what you're talking about.

Mr. SHAYS. My concern is that when they do their work, they'll then label it top secret. I don't mean to be facetious, but whenever we go down an interesting little area, then we aren't able to publicly pursue it.

Ms. HEIVILIN. What we are doing—and this won't be top secret—is we're looking at all of the various groups that are looking into different questions in this area. And we're going to fairly quickly have a matrix that is going to tell you and tell us exactly who is looking at what in this area, trying to come up with information and what they think their estimated time is for getting that information. We will then look at the gaps in the investigations going on, which will give us a piece of information about what needs to be done.

It may not answer the questions you're asking. One of the things that I think we believe is there's going to be a lot of questions unanswered for a very long time, maybe forever in this area.

Mr. SHAYS. The one thing that I am absolutely convinced of is that we are going to hold everyone accountable, including Congress and ourselves, that if some people feel that it's going to take so long that no one is going to care in the end, and they can just outlast the various investigations, they're just wrong. They're just wrong.

Pyridostigmine bromide—PB—and you did what I usually do, since I can't say it well, I just say PB—was to protect against sarin

exposure. This is a drug that is used for degenerative nerve disease. And it's not to be used in the way that DOD used it unless they had permission from the FDA. It becomes, in essence, because it is a drug used for another reason, an experimental drug.

This experimental drug was—the FDA gave the DOD permission to use PB. They had only two requirements. One is that they warn the soldiers that it is an experimental drug, which, by the way, our soldiers were ordered to take, which astounds me—an experimental drug which our soldiers were ordered to take. They had one other requirement besides notifying our soldiers. They were supposed to keep records. Did you uncover in your work that our troops were notified or not notified?

We have testimony from others that they were not notified in every instance—in most instances. And that we have testimony that they were not—that the DOD did not keep any accurate records on who ended up taking this drug and who didn't. Was this something that in your work you came across, and can you comment?

Mr. CHAN. I think we have seen reports on it. We did not look into the recordkeeping of who took——

Mr. SHAYS. I'm not expecting that you were. This is not an evaluation of your report.

Mr. CHAN. Right.

Mr. SHAYS. I'm just asking if you have. I want it to be part of the record. Yes.

Ms. HEIVILIN. In looking into that, many of the veterans were not notified. We were told that the reason they weren't is that the United States didn't want the Iraqis to know what we were protecting the troops against, what we were doing.

Mr. SHAYS. The DOD basically, because they felt that low-level exposure was not harmful to chemicals, basically began new studies after Congress ordered them to in 1996 and after Khamasiyah became public, which, by the way, they knew before it became public. This is not information that was new to them when it was new to the public. The only difference was that they were forced to acknowledge it, again, because a soldier, besides his word, had a video that documented it. That's the only reason they came forward.

Now, what's interesting to me is, the VA have very few people who have any expertise in chemical exposure. When we have asked the VA to produce a document of the thousands of doctors who have the expertise, practically no one showed up on that list.

Now, I'm interested to know if you got into this area as well. Did you get into the ability of the VA to properly diagnose and treat chemical exposure? Was that an area that you looked in?

Ms. HEIVILIN. No, we did not.

Mr. CHAN. We didn't look at that.

Mr. SHAYS. Has any committee asked you to look into this?

Ms. HEIVILIN. Not that I'm aware of. I don't think so.

Mr. CHAN. No.

Mr. SHAYS. There are only two countries in the world, to our knowledge, that have any expertise in chemical exposure. One of them, I believe, is Denmark.

Mr. SHARMA. That is correct.

Mr. SHAYS. And the other I am certain is Israel.

Mr. SHARMA. That is correct.

Mr. SHAYS. Dr. Sharma, do you have any knowledge of these two countries and this?

Mr. SHARMA. I'm aware that both these countries do have very good protection. But we do not know the details. In the course of our investigation we became aware of this issue. I would just make a comment to your statement that in the VA there is no expertise. And while we did not look at the VA, we did look at one research—actually two: the research by Dr. Haley and by Dr. Zamal of England.

And they point out something very interesting. And that is—this is a message that sort of has been missed in critiquing these studies—that when you do normal physical exams or medical exams, you will miss the subtle signs of brain damage that these people are experiencing, which suggests that when you are looking at these people you need different types of protocols that are more sensitive to detecting these kinds of changes that we are seeing in veterans.

Again, as I can tell you, we did not look at, but we do know from the research point of view that the current medical exams would not be able to see changes and they would not be adequate.

Mr. SHAYS. In the VA facility in West Haven, CT, they change their protocol a little earlier than some because the doctors that participate from Yale—one of them had a background in environmental health. And so they then had a bit more sensitivity to that issue. And that's really the only reason why one facility went forward. Now, you mentioned visiting two VA facilities where there seemed to be some expertise. Do you remember what those two facilities in your statement—on chemical exposure? You went to two VA facilities——

Mr. SHARMA. No. Those were two VA research centers.

Mr. SHAYS. OK.

Mr. SHARMA. But they were not—we did not look at specifically.

Mr. SHAYS. And you went to them because why?

Mr. SHARMA. Because we wanted to see what kind of research they were doing and the kinds of problems that they were experiencing. We had a protocol that we used. We wanted to talk to some of the primary investigators of those large studies.

Mr. SHAYS. Right. And so it was not your intention that, we're going to just go and we'll pick out two VA facilities and look at the great job they're doing? These were two that were charged to get into this area?

Mr. SHARMA. Yes.

Ms. HEIVILIN. Yes.

Mr. SHAYS. I just want the record to show that.

Ms. HEIVILIN. Right.

Mr. SHAYS. Thank you. Mr. Sanders.

Mr. SANDERS. Thank you, Mr. Chairman. Let me pick up on the point that Chris was making. And then if you could tell us, in your research, whether you see this as a pattern in terms of the DOD and the VA. The chairman mentioned that we heard for 5 years that there was no chemical exposure in the Persian Gulf theater. And then, in fact, it was as a result of probing from this committee

which finally got the DOD to acknowledge that there was an exposure at Khamasiyah. And I believe at one recent hearing Bernard Rostker, who represents the DOD, freely acknowledged that there may well have been other exposures as well. And I think that's where we are right now.

But from the very beginning there was a reluctance and—I think it's fair to say—cover up in that area of acknowledging that. The chairman just mentioned that this all took place despite the fact that alarms were going off all over the theater. And the conclusion reached by the authorities that, "Yeah, we have highly trained technicians who are manning the instruments. The alarms went off, but, hey, despite all of the alarms, the conclusion is there was no other additional exposure in that area."

We heard testimony—and I'd like you to maybe comment on this—at a recent hearing from Dr. Tiedt, who is a pharmacologist in Maryland—and I'm sorry, I can't remember exactly where. And he said that there were past studies done in fact by the DOD, if my memory is correct, dealing with the potentially dangerous effects of pyridostigmine bromide. And he was very, very concerned about the use of that drug.

I think the DOD official position, and the VA, is that based on everything that they know, it will not cause a problem. I was very interested. And the reason I'm asking these things is that it seems to me that there is a pattern out there. But I want you to comment on that based on your research. I mentioned earlier and I want to repeat something that I thought was interesting.

In 1995, the DOD itself did a study at Fort Detrick. This is the finding. "The principal finding is there is significant increase on the lethal effects of rats given pyridostigmine bromide, hermathrine and DEET simultaneously."

Now, you know what was very interesting to me—when that study was commented on in the PAC final report, you know what happened to the word "significant?" It came out: "A 1995 DOD study with rats reported that PB caused a slight increase in lethality of DEET and hermathrine when compared to expected additive values." The word "significant" went to the word "slight."

We have seen instances where researchers lost their jobs. I don't know that today there is a conclusion or an understanding. And I'd like you to help me on this one. Dr. Jonathan Tucker, Ph.D. served on the Presidential Advisory Committee staff as senior policy analyst responsible for investigating incidents of chemical and biological agent exposures. He was summarily dismissed after aggressively attempting to understand the extent of chemical exposures.

In other words, instance after instance, people come up with ideas. We have amazing things. One more thing—and I'd like you to comment on this. New York Times—April 17, 1996 headline: "Chemical Mix May Be Cause of Illness in Gulf War." "Researchers from two universities suggested yesterday that Gulf war syndrome might have been caused by exposure to ordinary harmless doses of two or more chemicals that together might cause nerve damage."

Six paragraphs down the line from the New York Times—"The Department of Defense said that the new report raised 'some interesting hypotheses' but that the Department had no direct knowledge of the details of the work."

A year earlier, the DOD itself had done a study which came up with almost exactly the same conclusion. Why would they not have said, "Gee, that's interesting. We did similar work a year ago. We've got two separate studies coming up with similar conclusions. Boy, we should get going."

My point, and I think the point that the chairman was making, is that it seems to us that wherever evidence comes forward that might suggest that the cause of the problem has something other to do than stress, those conclusions, that analysis, is dismissed. Researchers who are working on that are given short shrift—in some cases, actually fired. Is that a kind of pattern that you detected in your study of the DOD and the VA?

Mr. SHARMA. We found similar kinds of experience with some of the studies. And I will just use one. For example, Dr. Duffey, who testified here. His work was indeed supported by DOD. They were aware of the fact of what one would expect with low-level exposure to certain agents. They were some other reports that we cited. They were not considered. At least we have not seen that they have looked at. There are a lot of instances where we have found that work has been published. It's quite good work. The issue is the perspective.

I mean, you can do 100 studies and still say questions remain and we need to do more.

Mr. SANDERS. Right.

Mr. SHARMA. Or, in the absence of no contrary evidence, if you have a few studies, it leads you to believe that, yes, there is some suggestion that we are dealing with—how much is enough or exclusion of certain types of research when it is indeed there. And I agree with you.

Mr. SANDERS. So the examples that I have given and that the chairman has given, you have found to be not untypical of the approach of the DOD and the VA. Is that what I'm hearing you saying?

Mr. SHARMA. Yes.

Mr. CHAN. I think in a broader sense, what we have tried to do—we found often more questions were raised rather than the doors closed—and that we finish answering that question. The example that you and Mr. Chairman keep bringing out about the FOX vehicle and the detection—and, as I said, that's the other side of the pie, that I don't think the research is being looked into.

But it opens more questions about the sensitivity of our detection equipment. If they are very sensitive, and that, for some reason, we adjusted our equipment that way, which basically implies that we're trying to reduce the operational effectiveness of our soldiers, because every time an alarm is sounded, that means I have to put on the gear. And I've tried those things. Maybe I'm a little small in stature to carry those things. But you can't even put your finger into the trigger to fire something.

So in a way, from an operational point of view, you're defeating yourself. That's the first point. The second point is, that if, in fact, it's set up in such a way that other agents may trigger such alarms, then I think it's important for the Department of Defense to investigate and find out what is the possible false alarm rate that can create these things.

What it implies is that the enemy can use other agents to create these things to disrupt operation of the war and the battle itself, which is not a reasonable thing to do because that's not a very good piece of equipment. Because if every time tear gas can generate some alarm that you stop the operation and say, everybody put on a suit, that doesn't serve the soldier well. Because after a while, the soldier is going to ignore those alarms.

So it opens up a whole set of questions. And when you turn around to the other end—from a doctrinal point of view, the question is, would the enemy use full, pure chemical against us knowing that our response will be severe against them. So that question—you see what I'm saying—it opens up another set of questions.

I mean, they would be not very intelligent to use that kind of thing against us knowing that we'd retaliate, not necessarily in kind, but in massive retaliation against whatever, because that's our doctrine. So the next possible question is, well, if you're the enemy, you don't want that to happen, what would you do? Possibly reduce the purity? One other question is, could that be a possibility? Could we in fact design systems whereby it can trigger our equipment while at the same time does not achieve the immediate acute response that one would expect, so that there's no incident that triggers the entire sequence of events that they don't wish on themselves. I'm talking about the enemy here.

So what I'm saying is, these things you can test. You can try it out. When we captured the equipment through the United Nations, did we look into the purity of those chemicals and see what mixture is being used? If they were destroyed, why were they destroyed before we have a chance? And we enter with a whole tree of questions there. And this is beyond the health issues.

And we were stuck, to be honest with you. And that's why we said, OK, even in looking at the bomb sites, the inspected stuff, it doesn't quite make sense to us. We reach a certain impasse and we say, OK, we don't understand. We need to investigate further.

Mr. SANDERS. Let me change gear a little bit here and ask you another question. It would seem to me that we have a difficult problem. No question about that. Solutions are not easily arrived at. But it would seem to me fairly common-sensical that the VA and DOD would be as aggressive as they could in trying to look at whatever safe, at least, treatment protocols there were out there.

Mr. CHAN. Mm-hmm.

Mr. SANDERS. In other words, I talk, again, to the vets in the State of Vermont who said, "We're willing, as long as it's not going to make us worse, we're willing to look at alternatives. We know that maybe they won't cure us. But we're really hurting right now. We can't go to work. Give us something. Give us an option. Maybe it fails."

Mr. CHAN. Mm-hmm.

Mr. SANDERS. It seems to me—I know—that there are treatment protocols out there. And I think the VA and the DOD will tell us, well, they don't know if they're going to work. That may be true. But don't you think we owe it at least to the vets to allow them to take advantage of different types of treatments. And then we can learn from that. In other words, if there is a treatment out

there and we send vets to it and it doesn't work, it doesn't work. But then we know it doesn't work.

But doesn't that make more sense than saying, well, we don't have enough evidence yet to suggest that this could work. Am I missing something here? What do you think in terms of—what I'm asking is, in looking at different treatment protocols, is the VA and the DOD looking at alternative treatments even if they're not 100 percent guaranteed right now?

Ms. HEIVILIN. You're talking about human clinical trials.

Mr. SANDERS. Yes, right.

Ms. HEIVILIN. In order to do that you have to have a hypothesis and a proposed treatment.

Mr. SANDERS. Sure.

Ms. HEIVILIN. And I don't think anything that's been done has gotten that far yet.

Mr. SANDERS. Well, there has been. I know. For example, Dr. William Ray of the Environmental Health Center in Dallas has claimed that he has treated dozens and dozens of Persian Gulf veterans. That's what he says. He says he has had some success. We know veterans who have gone to him. Is his treatment effective or not? I don't know. But I think that we should at least try it out. The evidence is that nobody gets worse as a result of this treatment.

I know, because I entered into the record of one of our past hearings. Again, Dr. Mira Sheyavitz in Northampton VA hospital based her treatment on a diagnosis of multiple chemical sensitivity. She claimed—and I read some testimony from some of the veterans themselves. They said, "Yeah, I underwent this treatment. I felt better."

Now, in the long run, will that treatment work? I don't know. But it would seem to me that if you have even some inkling that there might be some success—Nicholson is another example. Why would we not go forward so long as we knew that people were not going to become ill, obviously. Am I missing something here?

Mr. CHAN. This is consistent with our first recommendation—what are the health effects and whether they are improving or not. And in doing so, hopefully, as we responded earlier, to say, let's find out are there things that appear to be working, even for a small percentage of people. And examine it that way.

Ms. HEIVILIN. Mm-hmm.

Mr. SANDERS. Right.

Mr. CHAN. And I think we're not coming out with new hypotheses and so on. But try to gather the data out there first, and they might capture some of those cases that you mentioned.

Mr. SANDERS. OK. I would just conclude that line of questioning by saying, Mr. Chairman, that we owe it to the vets at this point to begin to look at alternative types of treatment, to monitor the success or failure of those treatments, rather than just say, well, we're not 100 percent sure that treatment can work, we don't want to look at it.

Mr. CHAN. Mm-hmm.

Mr. SANDERS. OK. I yield back, Mr. Chairman.

Mr. SHAYS. Thank you. I think we're going to get you out in the next 15 or so minutes. I'd like to ask you, though—as it related to

the issue of the various sites that may have had chemical or biological agents that were destroyed, you mentioned that the numbers are difficult to determine of what sites were actually looked at and what weren't after the war. You said some of it was classified information. You were having a hard time sorting out the numbers.

We'll get to that even if I have to have confidential briefings. But it raises the question of whether there's anything—let me back up and say to you, one of my frustrations in this hearing is that I know of studies that were done on protective gear that are classified. I can't talk to you or publicly disclose information about the protective gear that our soldiers use because it's classified.

Is there anything in your report that would have been better had you not been limited by classification? By better I mean stronger, more specific.

Mr. CHAN. Well, I think that it does help if it's declassified. This will allow us to tell you where those sites are.

Mr. SHAYS. Is there anything else in your report?

Mr. CHAN. I'm sorry.

Mr. SHAYS. No. That's clear there.

Mr. CHAN. Yes, sir.

Mr. SHAYS. I mean, it would be very helpful to know that. Anything in addition to? Any other area that you walked down and you had walked back or you decided you couldn't make certain points because you couldn't back it up because the information was classified?

Mr. CHAN. Yes, I did.

Mr. SHAYS. Pardon me?

Mr. CHAN. Yes.

Mr. SHAYS. OK. The answer is yes?

Mr. CHAN. Yes.

Mr. SHAYS. OK. I want you to say it in a full sentence.

Mr. CHAN. I'm sorry. Yes——

Mr. SHAYS. You don't need to apologize. You've just answered yes. Now I want you to tell me what "yes" means.

Mr. CHAN. That there is other information that would make the report stronger if we could discuss it in an unclassified manner.

Mr. SHAYS. I have one other area. Well, actually, a few more. In your report, which you provide the agencies to have a response. And I think it's very appropriate that you did. The Department of Veterans' Affairs' comments to the General Accounting Office report. They respond on page 6 of their response; they say, "The VA strongly disagrees, though, with assertions contained within the GAO report that the epidemiological research to date has been inappropriate and is not likely to yield definitive conclusions."

It's on page 84 of your document. It's on page 6 of the document they submitted to you. Then they say:

The pursuit of epidemiological research has led to some of the most important findings and conclusions regarding Persian Gulf veterans illnesses to date. Epidemiological studies have shown so far that:

1. Persian Gulf veterans have not experience a high disease specific mortality rate in comparison to their non-deployed counterparts;

2. Persian Gulf veterans in the military have not been hospitalized more than their non-deployed counterparts;

3. Based on a study of military hospitalization records birth outcomes among spouses of Persian Gulf veterans and among female Persian Gulf veterans are no different than among their non-deployed counterparts; and

4. Persian Gulf veterans are experiencing a greater prevalence of self-reported symptoms.

Then they go on to say, "Were it not for these epidemiological studies, we would still lack answers to vital questions about Gulf war veterans' illnesses."

I have a big question mark by that. Because it says, "We will still lack answers to vital questions." What answers do we have from what I just read? What answers do we have? Or let me put it this way. Do you want to comment in general about this response to your report, this area here?

Mr. CHAN. Yes. We did a general comment. And I think we can answer it specifically about these references. One of the recommendations made by the President's Advisory Commission is that they need to look at the population broadly to determine are there prevalence. And we don't disagree with that. And the idea behind those is to generate hypotheses whereby one can focus on further research. And we don't disagree with that.

The problem that we find—I think I will just use one example of it. It's easier to discuss one research rather than all four of them. And I'm sure my colleague can add more. Initial studies that were done—and it's done peer review in a perfectly reasonable way and scientifically and so on. OK?

Now, if I take myself out of that research and ask the question, what have I gained out of this, what was done was really taking the entire 600-and-some-odd thousand veterans of Gulf war and comparing them to a control group, which is the people who didn't go to the war. First, we don't know what kind of people these people have, in fact, whether they actually landed on shore or not, were they exposed to anything of these 690,000 people.

The scientific paper basically recognized a couple of things. This is on mortality. I'm sorry. I'm talking without telling you what it is. Basically they arrive at the fact that when we compare them, there's no significance in terms of higher mortality with the exception that after the war they're subject to post-war problems and stress and all that.

I personally, as a researcher, I look at it—and my colleague may disagree with me—that the paper recognized that before the war began—that there's self-selection going on. That means those who went to the war were healthier. So you start with the health measures that's higher than the other cohorts that you're comparing. And when they finish the war, they're equal.

So I don't know the delta of better health that they begin with. Now, the authors recognize that this is one of the problems they had, which is a perfectly reasonable assumption. But when one concludes in public that there is no higher prevalence of mortality with the Gulf war veterans as a result of this paper, I think it's not quite correct to say that.

An example, could they have done—taken a control group and go through the same screening before they went to—even though they didn't go to the Gulf war—could we use them in the control group—will we reduce the number? Could we do a pre-post? That means, if they were healthy, can we compare them that's a single

treatment, which is the war, and after the war, are they worse off? And that's another way to measure.

So I think it's open up to a lot of interpretations with these four studies. But ideas generate hypotheses. And we're not quite sure what hypotheses they generate with the exception that now the mortality is not any higher or significantly higher than the control group.

Ms. HEIVILIN. Can I comment, too? It's important in each of these—and we didn't look at every single study and we didn't evaluate every single study. In fact, we were looking at whether hypotheses were generated from the studies. But we did look a little bit at the birth outcomes among the spouses. And that population—it's kind of important to note that that population excludes the most at risk population. It was births that were taking place in the DOD hospitals.

And when a pending birth is declared at risk, they're usually sent somewhere else outside of the DOD general hospitals. And of course, the veterans who were not still married and in active duty, which would probably also include some of your highest at risk population, your illest veterans—would not be included.

Mr. SHAYS. So, you responded, first, Mr. Chan, to the mortality. And you're responding to the——

Ms. HEIVILIN. Birth defect piece.

Mr. CHAN. Birth.

Mr. SHAYS. Now, there are really two issues here. One is that high risk pregnancies are less likely to take place in a military hospital.

Ms. HEIVILIN. Right.

Mr. SHAYS. The second, though, is to me—veterans don't go to military hospitals as a general rule. They're veterans.

Ms. HEIVILIN. Right. If they're out.

Mr. SHAYS. If they're out.

Ms. HEIVILIN. Well, of course, in that registry, you have people that are still in the service, too.

Mr. SHAYS. No, but that's the point. It's only people who are still in the service.

Ms. HEIVILIN. Right.

Mr. SHAYS. We're talking about most who don't have access to the military hospital.

Ms. HEIVILIN. Right.

Mr. SHAYS. It strikes me—and this is my primary point—it strikes me that the VA's approach to the causes of Gulf war illnesses, this research program is designed to find out what it isn't, not what the problem is. In other words, it's almost like they check off a list and say, well, it's not this, it's not this, it's not this.

I have a general feeling that the DOD and VA basically don't believe our veterans. That's the bottom line. So it's almost as they're trying to say, "OK. You're wrong. Because it's not this. You're wrong because it's not this and it's not this."

They're not coming to say, "OK. It's not this, this or this, therefore it is this."

I'm just curious to know, is this the typical way their research happens?

Ms. HEIVILIN. Well, the researchers undoubtedly exposed all of the limitations of their study—if you would read the actual outcome of the research. You're asking what——

Mr. SHAYS. I'm asking something a little different.

Ms. HEIVILIN. Right.

Mr. SHAYS. If you don't know the answer to my question, I'm not asking you to——

Ms. HEIVILIN. No. I understand. Do they typically do that? And——

Mr. SHAYS. The question that strikes me—and I'm just interested if you had that same view—that the VA, in particular, basically is justifying their good work by saying, "We've learned it's not this and we've learned it's not this and we've learned it's not this."

Now, I may even question what they learned, because I don't think they learned that. But it's an interesting—it's not like, "We've learned it is this. We've learned it is that."

Ms. HEIVILIN. Mm-hmm.

Mr. SHAYS. Maybe in my unscientific mind, I'm just simply observing that's not all that significant. If it was, I was curious to have a response.

Mr. CHAN. Well, if one does research in this manner—let me say that if you look at prevalence and find no high prevalence and conclude that the case is closed—yes, I agree with you. Because, in a way, the concept behind the current research is generally new—you know, you look at a broad population of people. You've decided it didn't happen with them. Then you look at a subpopulation. That's possibly the next step you take.

Now, as I said before, when you have these steps of research you go through, at some you have to look at cause and effect and treatment—the etiology and all that. If you stop right up front and say there's no high prevalence, then it's over. You see what I'm saying.

And I think that's sort of the problem. Because, you know, it won't generate new——

Mr. SHAYS. Mr. Chan, you're really making a very important point, it seems to me. What I think I'm hearing you say is that the VA is basically saying there's not a problem.

Mr. CHAN. Well, in regards to these, they certainly have expressed to us that finally this issue had been addressed in terms of birth defects and——

Mr. SHAYS. It's not a problem. There's no greater mortality. There's not a problem.

Mr. CHAN. Well, I can read it in the web site—and this is from the GULFLink, which basically said June 12, 1997: The latest medical study on——

Mr. SHAYS. Who is this and who is writing this right now?

Ms. HEIVILIN. VA web site.

Mr. CHAN. It's Mr. Rostker's web site.

Mr. SHAYS. OK.

Ms. HEIVILIN. DOD. I'm sorry.

Mr. SHAYS. DOD.

Mr. CHAN. DOD. I'm sorry.

Mr. SHAYS. Yes.

Mr. CHAN. "The latest medical study on birth defects among the children of veterans demonstrates that children of Gulf war veterans do not have an increased risk of birth defects."

Mr. SHAYS. It seems like all our—OK.

Mr. CHAN. If you go to the second page—it basically sets the limitations of the studies, which is what——

Mr. SHAYS. And the limitations of the study, in some cases, discredit the study.

Ms. HEIVILIN. Yes. I think it gets to our bottom line—you don't close out possible causes and possible treatments until you're absolutely sure. So you would close out this group of the population as not having problems. Let's look at—just as you said—let's look at the next group. Let's look at another group.

Mr. SHAYS. OK.

Mr. CHAN. But in this case here, let me add, though, that they said, "The limitation of this study being addressed in other research projects on reproductive health that are currently underway." So——

Mr. SHAYS. But it sounds to me, again, like the VA is using its resources to make studies to prove what it isn't.

Mr. CHAN. Mm-hmm.

Mr. SHAYS. In spite of the fact that some of their assumptions call into question the validity of their report.

Ms. HEIVILIN. Well——

Mr. SHAYS. But the whole emphasis is proving what it isn't, which then applies—well, why are we even going through this process? Instead of saying, "We know that our veterans are sick. What is it?"

Now, let me just ask two more points unless you want to make another comment. I just——

Ms. HEIVILIN. Can I just make one?

Mr. SHAYS. Sure.

Ms. HEIVILIN. I can see value of this kind of a study if you have—which you may have—many of your active duty people, personnel, who were in the Gulf, who are worried about this possibility. So it would be researched to see if, in fact, you could put that worry to rest or not.

Mr. SHAYS. Well, if I was a family giving birth to a child, and either my wife or it served in the Persian Gulf, I would take no comfort whatsoever that the VA had done a study in a military hospital that showed that there was no greater defect rate in births, given that it is military active personnel, and given that in most cases, the acute births are not going to be done in military hospitals.

Ms. HEIVILIN. Right. I was just commenting about the value of such a study.

Mr. SHAYS. Right. Well, let me just take the last two points. Given what we have learned of the handling of this whole process by DOD and the VA, should we assume that if similar conflicts occur in the future, would our forces still be at risk the same way they are now? Are there protocols in effect that you have learned of that say basically in the future this won't happen?

It relates the Bosnia question that was asked by Mr. Allen, but I wanted to ask it more generically.

Ms. HEIVILIN. We're getting into classified information. And we have recent studies that we could talk about in——

Mr. SHAYS. When we're done with this public hearing, I'd love it if you would meet with Mr. Sanders and I just for a few minutes, just to have a clear sense of where your limits are.

Ms. HEIVILIN. I can't discuss that answer in an unclassified forum.

Mr. SHAYS. No. I understand. Let me just put it this way.

Ms. HEIVILIN. OK.

Mr. SHAYS. I don't want any more generic conversation about this issue in private.

Ms. HEIVILIN. OK.

Mr. SHAYS. Let me just—first, and finally say to you, is there any question you wish we had asked, any area that you wish we had gotten into? If there is then let's do it now. Let's not have you tell me afterwards, why didn't you ask this question?

You ask a question I should have had the good sense to ask and then answer it or forever hold your peace. I'm serious about this. This is not even meant to be funny. I don't want to learn later that you wanted me to protect you; be asking a question that you didn't want to voluntarily come forward with. Is there any question that I could have asked in this very important hearing that we didn't ask, an area that we should have gotten into?

Mr. SHARMA. I think there is a question that I often ask myself.

Mr. SHAYS. OK.

Mr. SHARMA. If I was a veteran, what does this all mean to me?

Mr. SHAYS. Very good.

Mr. SHARMA. I have Congress——

Mr. SHAYS. Dr. Sharma, if you were a veteran, what does this all mean to you? Probably the best question I've asked all day.

Mr. SHARMA. I think I would be, I would be very confused and disturbed. On the one hand I hear about the very people who are caring for me are giving some contradictory information. Research is not going to be conclusive. I don't know what's going to happen to me. And I think that's an issue that is facing the veterans. And we all must try to address that concern.

Mr. SHAYS. Mr. Chan.

Mr. CHAN. I think that the question that concerns me is, at what point, timewise, will these things be resolved? And I think one of the real problems that you have posed before about taking a different approach to look at this problem—and I was thinking, if I'm a veteran, I want to have a group—be it VA, DOD or anybody else you're talking about—that, as a veteran, the credibility itself has to be based on the fact that if this group tells me that there's nothing there, that's an acceptable answer to me, then I think the matter would be closed.

It's a very difficult thing to say. But I don't know how to say it.

Mr. SHAYS. You said it.

Mr. CHAN. OK.

Ms. HEIVILIN. My concern in this whole area is how the military personnel feel about the credibility of the organization to protect them, take care of them, and respond to their needs. And a lot of what we're talking about here looks like there hasn't been the kind of response you would expect there to be. And I think it's important

that in the future, starting right today, that in this kind of a situation, that there be a credible response.

Mr. SHAYS. Mr. Sanders.

Mr. SANDERS. Mr. Chairman, just let me thank all of our guests for their testimony and their very hard work, which is very helpful to us. Just one question. And maybe you have researched it and maybe you haven't.

When I spoke to vets in the State of Vermont and in testimony that we have heard before this committee, we have heard from women who believe that they have been made ill with symptoms not dissimilar from their husbands' as a result of sexual contact or whatever. There is a case in Vermont of a woman who was jogging, I guess, 5 miles a day, and then after a while became so ill she could hardly walk without help.

Is that anecdotal? Is that just something that happens to people or have you, in your research, developed any patterns to suggest that women or maybe even kids—we heard some testimony, you recall, from a woman whose kids were ill as well. Do you have any conclusions on that?

Mr. SHARMA. In this study we did not do any original research. We looked at the research that has already been published in context of the conclusions that have been reached, in context of some other issues that were relevant. We did not collect original information from veterans.

Mr. SANDERS. Based on your review of the research, what should I tell some women in the State of Vermont who believe that they have been made ill? Is there research to suggest that that is, in fact, the case or that there is no correlation?

Mr. SHARMA. It's quite possible. They were exposed to a wide variety of exposure agents. We do not understand the precise mechanisms. And it's quite possible that their symptoms might be due to those exposures.

Mr. SANDERS. But that's a question that remains unanswered, like many others.

Ms. HEIVILIN. Right.

Mr. SANDERS. Mr. Chairman, let me just thank our guests very much for their efforts.

Mr. SHAYS. I thank the gentleman. We just want to get together with you for about 2 minutes after the hearing in a room.

Mr. CHAN. Sure.

Ms. HEIVILIN. OK.

Mr. SHAYS. But let me just, as my closing statement, say that I truly appreciate the findings of the GAO report, because it provides, really for the first time, a peer review opinion to so many concerns of the thousands of veterans who have contacted our committee or appeared before our committee.

So I thank you for your work. I'm sure you'll conclude that there are parts that aren't perfect. I, too, found it good that you made it Gulf war illnesses instead of Gulf war illness. And I have some criticisms like that. But for the most part, you have been a very

impressive panel. And you have, I think, been extraordinarily helpful to this committee.

Mr. CHAN. Thank you.

Mr. SHAYS. And with that, we will close this hearing.

[Whereupon, at 12:55 p.m., the subcommittee was adjourned.]