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GULF WAR ILLNESSES

HEARING

BEFORE A

SUBCOMMITTEE OF THE

COMMITTEE ON APPROPRIATIONS
UNITED STATES SENATE

ONE HUNDRED SIXTH CONGRESS

SECOND SESSION

SPECIAL HEARING

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GULF WAR ILLNESSES

THURSDAY, OCTOBER 12, 2000

U.S. SENATE,
SUBCOMMITTEE ON LABOR, HEALTH AND HUMAN
SERVICES, AND EDUCATION, AND RELATED AGENCIES,
COMMITTEE ON APPROPRIATIONS,
Washington, DC.

The subcommittee met at 9:30 a.m., in room SD–124, Dirksen Senate Office Building, Hon. Arlen Specter (chairman) presiding.

Present: Senators Specter, Gorton, and Hutchison.

OPENING STATEMENT OF SENATOR ARLEN SPECTER

Senator SPECTER. Ladies and gentlemen, the hearing of the Appropriations Subcommittee on Labor, Health, Human Services and Education will now proceed.

The focus of our hearing this morning is to examine the findings of the report by the Institute of Medicine, which was filed approximately a month ago on September 7, concerning Gulf war syndrome.

There have been extensive hearings on this very perplexing problem. Back in September of 1996 there was a joint hearing of the Senate Intelligence Committee with the Senate Veterans Affairs Committee. At that time, I chaired the Intelligence Committee. We have had a series of hearings in the Veterans Affairs Committee and had commissioned a special study. Former U.S. attorney for the Eastern District of Pennsylvania, Michael Rotco, who conducted a long study, published a very voluminous report.

Senator Rockefeller and I felt that there was a connection between these ailments of Gulf war syndrome, but the medical evidence has been complicated and not decisive. There are more than 125,000 veterans from the Gulf war who have complained of a variety of ailments. They were exposed to some 33 toxic agents. I will not go into them at this time because our witnesses will be doing that.

There has been an important Center for Disease Control study, which had found that Gulf war military personnel were more likely than those who did not serve in the Gulf war to report symptoms suggestive of cognitive dysfunction, depression, chronic fatigue, post traumatic stress disorder, and respiratory illnesses. That composite would be known generally as Gulf war syndrome.

I have conducted a series of hearings in my own State of Pennsylvania and have found many people complaining about very serious maladies, having been exposed to these toxic substances.

One of the perplexing problems was the failure of the Department of Defense to make candid disclosures as to what people faced at Khamisiyah. Finally it came to light, only as a result of hearings and investigations, and underscored the need for more candor by the Department of Defense. And this whole issue illustrates the importance of taking care of our Gulf war veterans and trying to define and determine as best we can the scientific causes.

Today's hearing was requested specially by my distinguished colleague from Texas, Kay Bailey Hutchison, who has a special interest in this subject. And she is a very valued member of the subcommittee; as a matter of fact, the full committee; as a matter of fact, the full Senate. So we are delighted to see Senator Hutchison here.

And I now yield to you, Kay.

OPENING STATEMENT OF SENATOR KAY BAILEY HUTCHISON

Senator HUTCHISON. Well, thank you very much, Mr. Chairman. And I do want to thank you for calling this hearing, because I think it is timely that we look into this. And I know all of you have testified before congressional committees before. But I think that the House committee in the last couple of weeks has opened this issue. There was an article just a couple of weeks ago about yet another study, saying that there is no link between toxins and gulf illnesses.

But, Mr. Chairman, like you, I was on the Intelligence Committee when we started looking at some of these studies. And I was on the Armed Services Committee when we got the early testimony from the Department of Defense that basically said Gulf war syndrome was just psycho-somatic. That was the early testimony.

But then, as we have gone down the road, as I have talked to veterans in my home State, where people have just come up to me not even knowing of all of the studies that have been done, not even knowing that there is something out there for them, but they talk about their symptoms.

And then I have been very interested in the initial studies from the University of Texas Southwestern Medical School, which I think really starts pinpointing something that we can hold onto, that says basically if there is a certain brain receptor, you are going to be more susceptible to chemical gases.

And I think that warrants much further study and perhaps could be used for preventive measures for the chemical warfare that we might look to be involved in in the future and even for people who deal with pesticides in every day life. I think there are a lot of potential uses, if we can take a nugget like this and see what can be done.

So I did ask for this hearing to be held for a variety of reasons. No. 1, one in seven Desert Storm veterans reporting symptoms just cannot be anecdotal. This is too prevalent for us not to look further into it, not that you have not looked into it. I know you have spent hundreds of millions of dollars.

But I think now that we are beginning to see that there is some scientific basis that perhaps we can expand on, I am hoping that we can look at the types of projects that we have done and see if

there is a way to focus the research and do some things that might now give us better results than we have gotten so far.

I guess, Mr. Chairman, that is it. I will not read my statement, but I do want to be able to hear from our witnesses. And then I do have a number of questions for them that I hope will come to the result that I think we all would want. And that is to be able to treat the veterans of the Desert Storm war for the symptoms that they are experiencing, and then second to expand that research for preventive measures. Because there is no doubt in my mind that as we look at the security threats to the United States, chemical warfare is one of the serious threats that I think we could prevent, or at least be able to treat.

I think that will also apply to civilian terrorist attacks. We see in Tokyo that a civilian terrorist has figured out how the use of sarin gas can be used for threatening purposes. And so all the research that we do for our veterans and for the prevention of harm to future military personnel will also be applicable to civil terrorism.

And then third, just the general potential for people who deal with chemicals in every day life. You have people who work in labs. You have people who work in farm jobs. You have people who work in chemical plants. It happens that in my home State of Texas we have 50 percent of the petro-chemical industry in the world. I would love to have this kind of research for our civilian population.

So that is why I am interested. That is why I asked you to call the hearing. And I thank you very much for doing it.

Senator SPECTER. Thank you very much, Senator Hutchison.

STATEMENT OF BERNARD D. ROSTKER, Ph.D., UNDER SECRETARY FOR PERSONNEL AND READINESS, DEPARTMENT OF DEFENSE

Senator SPECTER. Our first witness will be Dr. Bernard Rostker, who has been the special Department of Defense expert on Gulf war illness. Dr. Rostker served 4 years as Under Secretary of the Army and has recently been promoted to Under Secretary of Defense for Personnel and Readiness.

Dr. Rostker, the first question to you, that really is a promotion, is it not?

Dr. ROSTKER. Yes, it is.

Senator SPECTER. OK. We will turn to you first. Our practice is to have 5 minute opening statements leaving the maximum amount of time for Q&A dialogue. Dr. Rostker.

Dr. ROSTKER. Thank you, Mr. Chairman. I would also note that just recently the Secretary of Defense made the Office of Gulf War Illnesses a permanent office to oversee medical readiness and military deployment, as well as to continue our focus on Gulf war illnesses. This is, in fact, the ultimate lesson to be learned from the Gulf war, and that is that the Department was not well suited to deal with non-traditional kinds of casualties and issues raised by the Gulf war.

So we want to make sure we learn the lesson to be responsive to our veterans and take their concerns seriously and to do what is necessary to account for what happened on the battlefield in the Middle East and any future battlefields. So you have our commitment.

The Department is very appreciative of the work of the Institute of Medicine and their efforts to review the medical literature relating to the possibility of an association between the various exposures and the illness of our veterans. The IOM reviewed over 10,000 abstracts and over 1,000 peer-reviewed articles. The IOM used a well-established taxonomy for categorizing their findings in terms of whether the literature would support a conclusion that sufficient evidence of a casual relationship existed, that sufficient evidence of an association existed, whether there was limited or suggested evidence of an association, whether there was inadequate or insufficient evidence to determine whether an association existed, or whether there was limited evidence of no association.

As you know, the IOM examined the program of vaccinations of sarin, pyridostigmine bromine and depleted uranium. They were able to draw a number of conclusions using the five point scale. I think the most interesting from our point was their conclusions concerning the lack of a robust literature to draw conclusions over unusual occurrences with depleted uranium, long-term effects of pyridostigmine bromine, exposure to low doses of sarin in terms of long-term adverse effects, long-term adverse effects from anthrax, botulism vaccine and multiple vaccines. These are mainly areas where research has not gone forward because these questions had not been previously raised in the medical literature.

We were particularly noteworthy their conclusions concerning depleted geranium, that the literature was robust enough for the conclusion that there was no association for exposure to uranium and lung cancer or exposure to uranium and renal dysfunction at exposure levels that one would have anticipated were many times greater than that seen in the Gulf.

All of these conclusions are quite consistent with the positions taken by the Office of the Special Assistant, as we have gone through the literature ourselves. And so this was reinforcing the conclusions that we had. We support the IOM and the research community and the need for continuing research. And I think some of my colleagues here will talk about that.

So again, in closing, we appreciate the interest of this committee and that others have shown on the health of our men and women who serve and who will continue to serve in the armed forces. Their health and fitness are our paramount concern. The department wants to achieve this goal to take care of these men and women and their families and to protect their health.

PREPARED STATEMENT

We recognize that our commitment to keeping our veterans healthy does not end when they leave the active service. There will remain a strong post-deployment evaluation and program, in coordination with the Department of Veterans Affairs, and continue to move forward to implement our force health protection strategy.

I appreciate the opportunity to be here. And I will be happy to answer any questions you may have.

[The statement follows:]

PREPARED STATEMENT OF BERNARD D. ROSTKER

Mr. Chairman and members of the Committee, I am pleased to be here today to provide testimony before this subcommittee. I am Dr. Bernard Rostker, Under Secretary of Defense, Personnel and Readiness and Special Assistant to the Secretary of Defense for Gulf War Illnesses, Medical Readiness, and Military Deployments. In your invitation letter you indicated the purpose of today's hearing was to examine the findings of the recent Institute of Medicine's (IOM) Report on the Gulf War and Health.

The IOM committee and staff reviewed more than 10,000 abstracts of scientific and medical articles related to the agents selected for study and then carefully examined the full text of over 1,000 peer-reviewed journal articles. The IOM committee used the five established categories of association below, because they have gained wide acceptance for more than a decade by Congress, government agencies, researchers, and veterans groups.

—Sufficient Evidence of a Causal Relationship.
—Sufficient Evidence of an Association.
—Limited/Suggestive Evidence of an Association.
—Inadequate/Insufficient Evidence to Determine Whether an Association Does or Does Not Exist.
—Limited/Suggestive Evidence of No Association.

I have summarized the IOM committee findings in each of these categories of association:

Sufficient Evidence of a Causal Relationship

—Exposure to sarin and a dose-dependent acute cholinergic syndrome that is evident seconds to hours subsequent to sarin exposure and resolves in days to months.

Sufficient Evidence of an Association

—Pyridostigmine bromide and transient acute cholinergic effects in doses normally used in treatment and for diagnostic purposes.
—Anthrax vaccination and transient acute local and systemic effects.
—Botulinum toxoid vaccination and transient acute local and systemic effects.

Limited/Suggestive Evidence of an Association

—Exposure to sarin at doses sufficient to cause acute cholinergic signs and symptoms and subsequent long-term health effects.

Inadequate/Insufficient Evidence to Determine Whether an Association Does or Does Not Exist

—Exposure to uranium and lymphatic cancer; bone cancer; nervous system disease; nonmalignant respiratory disease; or other health outcomes (gastrointestinal disease, immune-mediated disease, effects on hematological parameters, reproductive or development dysfunction, genotoxic effects, cardiovascular effects, hepatic disease, dermal effects, ocular effects, or musculoskeletal effects).
—Pyridostigmine bromide and long-term adverse health effects.
—Exposure to sarin at low doses insufficient to cause acute cholinergic signs and symptoms and subsequent long-term adverse health effects.
—Anthrax vaccination and long-term adverse health effects.
—Botulinum toxoid vaccination and long-term adverse health effects.
—Multiple vaccinations and long-term adverse health effects.

Limited/Suggestive Evidence of No Association

—Exposure to uranium and lung cancer at cumulative internal dose levels lower than 200 mSv or 25 cGy.
—Exposure to uranium and clinically significant renal dysfunction.

The Department of Defense agrees with the findings of the Institute of Medicine. Moreover, their conclusions on Depleted Uranium (DU) reinforce the position of the Special Assistant for Gulf War illnesses most recently stated in the 3rd annual report ". . . the scientific literature did not indicate negative health effects from the chemical toxicity of DU. In addition, the literature review did not reveal negative health effects in humans from the exposure to ionizing radiation from depleted or natural uranium." These conclusions were based on work done by RAND and our own investigations modeling the levels of exposure to DU our Gulf War veterans potentially experienced.

The findings by IOM support the direction and emphasis of our ongoing research and investigations concerning potential exposures and illnesses among our Gulf War veterans.

The Departments of Defense, Veterans Affairs, and Health and Human Services continue to support a robust research program on illnesses among Gulf War veterans, sponsoring over 190 distinct research projects through fiscal year 2000. As of March 31, 2000, 109 of these projects were ongoing. Through fiscal year 1999, the Federal Government had cumulative expenditures of over $125 million for research. Of this total, the DOD had funded almost $93M or 75 percent of all federal research.

We appreciate the interest this Committee and others have shown in the health of the men and women who serve and have served this nation in our armed forces. The health and fitness of military personnel have long been concerns of those responsible for ensuring troop readiness and effectiveness. The Department wants to achieve its goal to take care of those men and women and their families, and protect their health. We recognize that our commitment to keeping our veterans healthy does not end when they leave active service. We will maintain a strong post deployment evaluation and care program in coordination with the Department of Veterans Affairs and continue to move forward to implement our Force Health Protection strategy.

Again, we appreciate the opportunity to testify before this Committee, and look forward to answering your questions.

Senator SPECTER. Thank you very much, Dr. Rostker.

STATEMENT OF JOHN R. FEUSSNER, M.D., CHIEF RESEARCH AND DEVELOPMENT OFFICER, DEPARTMENT OF VETERANS AFFAIRS

ACCOMPANIED BY DR. MARK BROWN, DIRECTOR OF ENVIRONMENTAL AGENT SERVICES, DEPARTMENT OF VETERANS AFFAIRS

Senator SPECTER. We now turn to Dr. John Feussner, Chief Research and Development Officer for the Department of Veterans Affairs, a position he has held since 1996. And that involves the direction and overseeing of the VA research program.

Dr. Feussner is accompanied by Dr. Mark Brown, Director of Environmental Agent Services for the Department of Veterans Affairs.

So welcome, Dr. Feussner, and the floor is yours.

Dr. FEUSSNER. Thank you, Mr. Chairman, Senator Hutchison. And thank you for the opportunity to discuss the status of the current Federal research program on Gulf war veterans' illnesses. In your invitation letter, you indicated that the purpose of the hearing was to review the findings and recommendations of the recent Institute of Medicine report, Gulf war and Health, that focused on depleted uranium, the nerve gas sarin, pyridostigmine bromide, and vaccines.

To date, the Federal Government is projecting cumulative expenditures of $151 million for Gulf war research from fiscal year 1994 through fiscal year 2000. There are over 192 projects at various stages of completion in the research portfolio on veterans' illnesses. For the sake of brevity, Mr. Chairman, I will summarize only the research recommendation of the Institute of Medicine report and the response of the Research Working Group.

With regards to sarin, the Institute of Medicine recommended that long-term follow-up of populations exposed to sarin in the Matsumoto and Tokyo terrorist attacks continue. The Research Working Group concurs with that Institute of Medicine recommendation.

The IOM recommended studies on experimental animals to investigate the long-term effects of acute short-term exposures to sarin at doses that do not cause overt cholinergic effects. Since

1996, DOD has funded nine toxicology studies focusing on the effects of sarin alone or in combination.

Mr. Chairman, in addition to the Institute of Medicine recommendation on animal studies of sarin, the Research Working Group is coordinating three epidemiological studies that are focusing on the health of veterans potentially exposed to low-level sarin during the demolitions at Khamisiyah, one at the Naval Health Research Center in San Diego, a second at the Oregon Health Sciences University in Portland, and the medical follow-up agency of the Institute of Medicine.

In addition to the IOM recommendation on animal studies on sarin, the Research Working Group has also coordinated a contract for the medical follow-up agency to perform an epidemiological study of the long-term effects of low dose exposures to nerve agents in human volunteers in experiments conducted at the Aberdeen Proving Grounds in the 1950s.

With regards to pyridostigmine bromide, the IOM recommends research on chemical interactions between pyridostigmine bromide, PB, and other agents such as stressful stimuli and certain insecticides. Since 1994, VA and DOD have funded 30 projects related to PB alone or in combination with other chemicals or stressful stimuli. One important and consistent result of recent studies is that stressful stimuli, such as swimming, heat or restraint stress, do not cause an increase in the permeability of the blood brain barrier or cause PB to cross the blood brain barrier into the brain. The IOM recommended research on differences in genetic susceptibility that may contribute to increased risk of disease. VA and DOD have funded eight projects on genetic factors that may alter susceptibility of the effects of sarin and PB.

With regards to the issue of vaccines, the IOM has recommended long-term systematic research to examine potential adverse effects of anthrax and botulinum toxoid vaccination in multiple species and strains of animals. The Research Working Group concurs that long-term research is needed to examine potential adverse effects. Such research is under way in DOD laboratories. Also, CDC plans to fund non-human primate studies on the health effects and efficacy of the anthrax vaccine later this fiscal year.

The IOM recommended that identification of cohorts of Gulf war veterans and Gulf war-era veterans for whom vaccine records exist, that those veterans be studied. The CDC published a study of Air Force Gulf war veterans in 1998, which included measuring antibodies to the anthrax and botulinum vaccines to determine which individuals had received the vaccine. The CDC found that no relationship between the vaccinations and the development of a multisymptom illness.

Similarly, researchers in the United Kingdom have also published a study this year on a cohort of 923 Gulf war veterans for whom vaccination records exist. To date, there was no association between having received anthrax vaccine and the development of a multi-system illness.

Finally, with regards to depleted uranium, the Institute of Medicine recommended continued follow-up of the Baltimore cohort of Gulf war veterans with depleted uranium exposure. The Research Working Group again concurs. While the Baltimore clinicians have

seen no definitive evidence of adverse clinical outcomes associated with uranium exposure to date, the veterans who were involved in these friendly fire incidents will remain under continuing medical surveillance.

The IOM recommended additional studies of the effects of depleted uranium in animals. DOD has funded five toxicology projects——

Senator SPECTER. Dr. Feussner, could you summarize the balance of your testimony, please?

Dr. FEUSSNER. Yes. I am virtually finished.

Mr. Chairman, we know that combat casualties do not always result in obvious wounds and that some veterans from all conflicts return with debilitating health problems. The VA recognizes its responsibility for developing effective treatments and prevention strategies for such illness.

PREPARED STATEMENT

Mr. Chairman, thank you again for permitting me this opportunity to summarize our work. I will conclude my testimony here and ask that my entire written testimony be entered into the record.

Senator SPECTER. Your statement in full will be made a part of the record, as will all statements.

[The statement follows:]

PREPARED STATEMENT OF JOHN R. FEUSSNER

Mr. Chairman and members of the Subcommittee, thank you for this opportunity to discuss the status of the current Federal research program on Gulf War veterans' illnesses. I serve as the Department of Veterans Affairs' (VA) Chief Research and Development Officer and the Chairperson of the Research Working Group (RWG) of the Persian Gulf Veterans Coordinating Board (PGVCB).

In your invitation letter, you indicated that the purpose of the hearing was to review the findings and the recommendations of the recent Institute of Medicine (IOM) report, "Gulf War and Health, Volume 1.: Depleted Uranium, Sarin, Pyridostigmine Bromide, Vaccines." In addition, I will provide a progress report on research on Gulf War veterans' illnesses.

As you know, the United States deployed nearly 700,000 military personnel during the Gulf War from August 1990 to the cease-fire on February 28, 1991. Within months of their return, some Gulf War veterans reported various symptoms and illnesses that they considered to be connected to their war-time service. Veterans, their families, and the VA have been concerned about possible health effects from exposures during the Gulf War, including chemical warfare agents, the anti-nerve agent drug pyridostigmine bromide, vaccines, and depleted uranium.

OVERVIEW OF THE RESEARCH PORTFOLIO ON GULF WAR VETERANS' ILLNESSES

To date, the Federal government is projecting cumulative expenditures of $155 million for Gulf War research from fiscal year 1994 through fiscal year 2000. There are 192 projects at various stages of completion in the research portfolio on these veterans' illnesses. In fiscal year 1999 and fiscal year 2000, 42 new projects have been added to this portfolio. Research projects have been funded in the categories of basic research and applied research, such as clinical epidemiology and population-based epidemiologic research. To date, 83 federally funded projects have been completed. All projects and their focus areas are described in detail in annual reports that are submitted to Congress each year. An important role of the Research Working Group (RWG) is programmatic review and recommendations to funding agencies on research proposals that have been competitively and scientifically reviewed. The RWG continues to work diligently to foster the highest standards of competition and scientific review for all research on Gulf War veterans' illnesses. This is consistent with one of the recommendations made by the Senate Veterans Affairs' Committee in the Report of the Special Investigation Unit on Gulf War Illnesses (SIU report).

The recommendation was that DOD and VA "should only fund Gulf War health research pursuant to an impartial, scientific peer review process, except in the case of the most serious and extreme circumstances."

IOM REPORT: GULF WAR AND HEALTH, VOLUME 1.

Background on the IOM report

The Under Secretary for Health sent a letter to the National Academy of Sciences Institute of Medicine (IOM) on October 31, 1997 requesting an IOM study. The purpose of the study was to comprehensively review, evaluate, and summarize the published peer reviewed scientific literature regarding the associations between various Gulf War exposures and adverse health effects experienced by some Gulf War veterans. The IOM was also requested to make recommendations for additional scientific studies to resolve areas of continued scientific uncertainty related to health consequences of Gulf War service. On June 24, 1998, VA signed a contract with the IOM for a 27-month study, at a total cost of $1.25 million.

This effort was modeled after the successful process VA has used since the early 1990s to establish compensation policy for Vietnam veterans exposed to Agent Orange.

Four months later, in October 1998, Congress supported this effort with legislative mandates, including the "Veterans Programs Enhancement Act of 1998" (Public Law No. 105–368) and the "Persian Gulf War Veterans Act of 1998" (Public Law No. 105–277). The contract with IOM meets the requirements of these Acts.

The IOM reviewed the scientific and medical literature on the adverse health effects associated with exposure to sarin, pyridostigmine bromide, vaccines, and depleted uranium. The review took into account the strength of scientific evidence and the appropriateness of the scientific methods used to identify associations. It includes an assessment of biologic plausibility that these exposures are associated with illnesses experienced by Gulf War veterans. In many cases, the data distinguished differences between transient and long-term health effects, related to the dose of the exposure. Therefore, IOM reported separate findings on the potential transient, short-term effects of each exposure, as well as the potential long-term effects. As required by Public Law 105–277 and Public Law 105–368, the Department is currently evaluating the IOM report to determine whether or not a presumption of service connection is warranted for any illness related to the exposures covered in the report.

A major strength of the study is that in planning its work, the IOM committee asked representatives of veterans service organizations for advice in setting its priorities. Veterans advised the committee to begin the project by reviewing these specific risk factors. Therefore, this report looked at the exposures that were of greatest health concern to veterans themselves. The IOM report should provide some reassurance to veterans and their families about these health concerns.

Findings and Recommendations of the IOM Report and Response of the Research Working Group

Sarin

IOM Findings on potential long-term effects of sarin: IOM concluded that there was limited or suggestive evidence of an association between "exposure to sarin at doses sufficient to cause acute cholinergic signs and symptoms and subsequent long-term health effects." IOM concluded that there was inadequate evidence to determine whether an association does or does not exist between "sarin at low doses insufficient to cause acute cholinergic signs and symptoms and subsequent adverse long-term effects." This is consistent with one of the conclusions of the SIU report, which stated "There is insufficient evidence at this time to prove or disprove that there was an actual low level exposure of any troops to chemical weapon nerve agents or that any of the health effects some veterans are experiencing were caused by such exposure."

Basis for IOM Findings on potential long-term health effects of sarin: IOM stated that, after human exposures to sarin at doses high enough to cause poisoning symptoms, numerous chronic effects have been reported. These health effects have been observed in industrial workers accidentally exposed to sarin in the U.S. and in the two terrorism attacks in Japan. IOM noted that "there are no well-controlled studies of long-term health effects in humans exposed to sarin at doses that do not produce acute signs and symptoms."

IOM Recommendations and Research Working Group Response:

1. Long-term follow-up of populations exposed to sarin in the Matsumoto and Tokyo terrorist attacks.

The RWG concurs with IOM's recommendation that Japanese scientists should continue the long-term follow-up of populations exposed to sarin in the Matsumoto and Tokyo terrorist attacks. We plan to keep apprised of the results of these studies.

2. Studies in experimental animals to investigate the long-term effects of an acute, short-term exposure to sarin at doses that do not cause overt cholinergic effects and minimal acetylcholinesterase inhibition.

Since 1996, DOD has funded several studies of the long-term effects of short-term sarin exposure at doses that do not cause overt symptoms and cause only minimal acetylcholinesterase inhibition. Nine toxicology studies are focusing on the effects of sarin, alone or in combination. These combinations have included PB, DEET, permethrin, chlorpyrifos, heat stress and/or exercise stress.

3. In addition to the IOM recommendation on animal studies on sarin, the RWG is coordinating three epidemiological studies that are focusing on the health of veterans potentially exposed to low-level sarin due to the demolitions at Khamisiyah. The results of one of these projects were published in 1999 (project DOD–1B). The conclusion was there were no differences in rates of health problems among Gulf War veterans, who were potentially exposed to subclinical levels of sarin, compared to Gulf War veterans who were not exposed. The second Khamisiyah-related project is being performed by the Oregon Health Sciences University (DOD–63). The purpose is to compare neurological symptoms and results of neurobehavioral tests between Gulf War veterans, who were potentially exposed to low levels of sarin, versus Gulf War veterans who were not exposed. The third Khamisiyah-related project is being performed by the Medical Follow-Up Agency (MFUA) of the IOM (DOD–69). The purpose is to compare self-reported health problems between Gulf War veterans, who were potentially exposed to low levels of sarin, versus Gulf War veterans who were not exposed.

4. In addition to the IOM recommendation on animal studies on sarin, the RWG is coordinating a contract for MFUA to perform an epidemiologic study of the long-term effects of short-term exposure to nerve agents in human volunteers in experiments conducted at Aberdeen Proving Ground in the 1950s to 1970s (DOD–93).

5. Research on genetic factors that may alter susceptibility to sarin toxicity.

VA and DOD have funded a number of research projects on genetic factors that may alter the susceptibility to sarin and/or PB toxicity. These studies are described in detail in the section on PB below.

Pyridostigmine Bromide (PB)

IOM Findings on potential long-term effects of PB: IOM concluded that there was inadequate evidence to determine whether an association does or does not exist between PB and long-term adverse health effects.

Basis for IOM Findings on potential long-term health effects of PB: IOM noted that no reports of chronic toxicity were available related to human PB exposure in clinical or military populations. IOM reviewed two studies of PB use in Gulf War veterans, and concluded "the epidemiological data do not provide evidence of a link between PB and chronic illness in Gulf War veterans."

IOM Recommendations and Research Working Group Response:

1. Research on chemical interactions between PB and other agents such as stressful stimuli, and certain insecticides.

Since 1994, VA and DOD have funded 30 projects related to PB, alone or in combination with other chemicals or stressful stimuli. In particular, VA and DOD have funded 18 projects on the potential interactions between PB and other agents. Five of these projects have published results, focusing on the effects of PB in rodents, in combination with DEET, permethrin, swimming stress, restraint stress, or exercise stress (projects VA–49, DOD–10, DOD–37, DOD–62, DOD–65). One important and consistent result of recent studies is that stressful stimuli, such as swimming stress or restraint stress, do not cause an increase in the permeability of the blood-brain barrier, or cause PB to cross the blood-brain barrier into the brain. In 1996, the earliest research in this area was performed, which indicated increased permeability of the blood brain barrier to PB, due to swimming stress in a particular strain of mice. Several more recent studies have failed to replicate this finding using a variety of species, a variety of types of stressful stimuli, and extremely high doses of PB.

2. Research on differences in genetic susceptibility (e.g., genetic polymorphisms of butyrylcholinesterase or paraoxonase) that may contribute to increased risk of disease.

VA and DOD have funded eight projects on genetic factors that may alter susceptibility to the effects of PB or sarin, including polymorphisms of enzymes. Four projects in humans are evaluating the effects of genetic differences in

polymorphisms of acetylcholinesterase, butyrylcholinesterase, and/or paraoxonase (projects DOD–21, DOD–60, DOD–65, DOD–112). Two projects in humans are evaluating the effects of gender and weight (project DOD–11, DOD–64). Two projects in rats are evaluating the effects of genetic differences in polymorphisms of acetylcholinesterase and butyrylcholinesterase (VA–5D, VA–49).

3. Epidemiological studies on the possible long-term health effects of PB.

The RWG concurs with IOM that neurologists, who perform long-term follow-up of the course and treatment of myasthenia patients, should consider the possible long-term effects of PB. These patients take PB for many years. IOM concluded that PB has been used safely and effectively in thousands of myasthenia gravis patients since the 1950s. However, there has not been a systematic evaluation to determine if there are subtle long-term effects. We plan to keep apprised of the results of such long-term studies of myasthenia gravis patients, and we have instituted contacts on this issue with the Myasthenia Gravis Foundation of America.

Vaccines

IOM Findings on the potential long-term effects of vaccines: IOM concluded that there was inadequate evidence to determine whether an association does or does not exist between anthrax vaccination, botulinum toxoid vaccination, or multiple vaccinations, and long-term adverse health effects.

Basis for IOM Findings on potential long-term health effects of vaccines: IOM stated there were no published, controlled studies of the long-term effects of anthrax vaccination or botulinum toxoid vaccination. IOM reviewed only a few studies of the long-term effects of multiple vaccinations, which were too limited to draw conclusions.

IOM Recommendations and Research Working Group Response:

1. Long-term systematic research to examine potential adverse effects of anthrax and botulinum toxoid vaccination in multiple species and strains of animals.

The RWG concurs that long-term research is needed to examine potential adverse effects of anthrax and botulinum toxoid vaccination in experimental animals. Such research is underway in DOD laboratories. Also, CDC plans to fund non-human primate studies of the health effects and efficacy of the anthrax vaccine in late 2000.

2. Identification of cohorts of Gulf War veterans and Gulf War era veterans, for whom vaccination records exist, followed by careful studies of current symptoms, functional status, and disease status.

The Centers for Disease Control and Prevention (CDC) published a study of Air Force Gulf War veterans in 1998, which included measuring antibodies to anthrax and botulinum to determine which individuals had received the vaccines. The CDC found no relationship between the vaccinations and the development of a multisymptom illness (chronic symptoms of fatigue, cognitive and mood problems, and musculoskeletal pain).

The United Kingdom has also published a study in 2000 on a cohort of 923 Gulf War veterans for whom vaccination records exist. There was no association between having received the anthrax vaccine and the development of multisymptom illness, as defined by CDC.

3. Long-term longitudinal studies of the participants in the Anthrax Vaccine Immunization Program that would actively monitor and systematically collect and analyze data about symptoms, functional status, and disease status.

In 1999, DOD funded a long-term longitudinal study of participants in the Anthrax Vaccine Immunization Program. The Naval Health Research Center is establishing DOD-wide surveillance of hospitalizations in military hospitals, linking these to data on anthrax vaccine recipients (project DOD–99). This active surveillance system ensures early detection of any associations between vaccinations and severe reactions that require hospitalizations. In addition, there are several ongoing projects that are following smaller groups of vaccine recipients to evaluate adverse effects. In Chapter 7, IOM summarizes several of these smaller completed and ongoing human studies, nearly all of which are unpublished. IOM strongly urges the DOD investigators who are conducting these studies to submit their results to peer-reviewed journals for publication. Additionally, IOM recently started a new two-year study on the safety and efficacy of the anthrax vaccine, funded by DOD. This new study will review some of the unpublished, non-peer reviewed information that was not previously available.

Depleted Uranium (DU)

IOM Findings on the potential long-term health effects of DU: IOM concluded that there is limited or suggestive evidence that there is no association between exposure to uranium and "lung cancer at cumulative internal dose levels lower than 200 millisieverts or 25 centigrays." IOM also concluded that there is limited or sugges-

tive evidence that there is no association between exposure to uranium and "clinically significant renal dysfunction." IOM concluded that there was inadequate evidence to determine whether an association does or does not exist for several other potential long-term health effects.

Basis for IOM Findings on the potential long-term health effects of DU: IOM states that lung cancer has been the focus of many cohort studies of workers in the uranium processing industry. Many of these studies were large (thousands of subjects) and had a long period of follow-up (more than 20 years). Lung cancer mortality was not increased among workers in most of these cohorts, and IOM focused on the best quality studies in forming its conclusions about radiation exposure and lung cancer. IOM states that the weight of the human evidence indicates little or no clinically important kidney toxicity due to uranium exposure. IOM cited the strongest evidence as the absence of kidney damage in Gulf War veterans exposed to DU from embedded shrapnel. Kidney function was normal in these veterans, years after exposure, despite very high urinary uranium concentrations.

IOM Recommendations and Research Working Group Response:

1. Continued follow-up of the Baltimore cohort of Gulf War veterans with DU exposure. Long-term studies of the health of other Gulf War veterans at high risk for DU exposure (e.g. cleanup or radiation control units).

The RWG concurs with the long-term follow-up of the veterans in the Baltimore cohort, who were injured during friendly fire incidents. This cohort was expanded in 1999, beyond the original 33 individuals. While the Baltimore researchers have seen no definitive evidence of adverse clinical outcomes associated with uranium exposure to date, the veterans who were involved in the friendly fire incidents will remain under continuing medical surveillance. This is consistent with the SIU report, which stated that DOD and VA should "utilize the existing VA Depleted Uranium Medical Follow-Up Program to provide timely and in-depth medical evaluations to active duty troops and veterans with DU injuries."

In addition, since mid-1998, VA and DOD have offered a DU medical evaluation to hundreds of other veterans with potential DU exposure, such as those involved in cleanup operations or radiation control units. To date, the published data have shown that only veterans who have retained metallic fragments have demonstrated persistently elevated urinary uranium levels.

2. Continued follow-up of the cohorts of uranium processing workers.

The RWG concurs that the long-term follow-up should continue of cohorts of uranium processing workers. Many of these studies involve employees of manufacturing facilities managed by the Department of Energy or its contractors. Because of the recent increase in interest in the employees of these facilities, ongoing surveillance is likely to intensify in the future. We plan to keep apprised of the results of these studies.

3. Additional studies of the effects of depleted uranium in animals.

DOD has funded five toxicology projects that are investigating the health effects of DU in experimental animals (DOD–7A, DOD–7B, DOD–121, DOD–122, DOD–123). In particular, since 1994, the Armed Forces Radiobiology Research Institute (AFRRI) has been investigating the health effects of embedded DU pellets on rats. In Chapter 4, IOM cites the results of several published AFRRI studies. For example, there was no detectable kidney toxicity in rats embedded with DU pellets, even at very high concentrations of urinary uranium. Also, in early 2000, DOD released a Broad Agency Announcement to fund additional studies of health effects of heavy metals in experimental animals, including DU. Outcomes of particular interest include effects on the lung, liver, kidney, and nervous systems; and localized soft tissue responses of embedded fragments. Awards for these projects should occur by late 2000.

Plans for Additional Reviews by the IOM

The present study is only the first phase of a long-term IOM review. VA has already initiated a new contract for the next phase of IOM's review of Gulf War environmental risk factors. The contract calls for the same type of thorough review of peer reviewed literature on the potential health effects from exposure to solvents and pesticides used during the Gulf War. As with the previous study, it will require two years to complete, starting September 1, 2000, at a total cost of $3.57 million. Following that, we anticipate looking at the several other Gulf War risk factors. In addition, the VA and the IOM are committed to issuing updated reports as new evidence appears. VA has not ruled out any exposures as a possible contributor to Gulf War veterans' illnesses.

In summary, a process is in place to review the scientific evidence that becomes available regarding any health consequences from service during the Gulf War and

to grant compensation benefits using the same model as was used for Vietnam veterans regarding Agent Orange.

STATUS REPORT ON RESEARCH ON GULF WAR VETERANS' ILLNESSES

We know that combat casualties do not always result in obvious wounds, and that some veterans from all conflicts return with debilitating health problems. VA recognizes its responsibility for developing effective treatments and prevention strategies for such diseases. Studies clearly show that some Gulf War veterans report a variety of chronic and ill-defined symptoms including fatigue, neurocognitive, and musculoskeletal problems, at rates that are significantly greater than non-deployed veterans.

Four Major Research Initiatives on Illnesses in Gulf War Veterans

Highlights of the ongoing research efforts on Gulf War veterans' illnesses include two major treatment trials, Phase III of the VA National Survey, and a new epidemiological study of amyotrophic lateral sclerosis (ALS) in Gulf War veterans.

As a result of epidemiological findings to date, subgroups of ill Gulf War veterans have been identified for whom trials of potential treatment are appropriate. In the spring of 1998, the VA Cooperative Studies Program initiated planning for two treatment trials, subsequently known as the "ABT" (antibiotic treatment) and "EBT" (exercise-behavioral therapy) trials. Both trials underwent thorough scientific review and were approved for funding only after rigorous external review provided by the Cooperative Studies Evaluation Committee. Patient characteristics for entry into both trials are similar. All veterans who served in the Gulf between August 1990 and August 1991 are eligible for the studies. Patients are considered to have Gulf War Veterans' Illnesses (GWVI) if they have at least two of three symptoms (fatigue, musculoskeletal pain, neurocognitive dysfunction) that began after August 1990 and that have lasted for more than six months up to the present.

The ABT trial has completed its enrollment of 491 Gulf War veterans at 28 sites throughout the U.S. The study initiated patient accession in May of 1999. The primary hypothesis of the study is that antibiotic treatment directed against mycoplasma species will improve functional status of patients with GWVI who are tested as mycoplasma positive at baseline. The total cost of this treatment trial is approximately $13 million. The trial will be completed in October 2001, when patient follow-up is finished.

Preliminary demographic information indicates that 15 percent of the study participants are women, nearly 20 percent represent minority groups, 37 percent have attained an educational level of college or higher, and about 70 percent are employed. Nearly 85 percent of patients enrolled in the study exhibit all three symptoms of fatigue, pain, and neurocognitive difficulties.

The EBT trial has completed enrollment of nearly 1,100 Gulf War veterans at 20 sites throughout the U.S. The study initiated patient accessions in April of 1999. The primary hypotheses of the study is that both aerobic exercise and cognitive behavioral therapy (CBT) will significantly improve physical function in veterans with GWVI, and that the combination of CBT and exercise will be more beneficial than either treatment would be alone. The cost of this treatment trial is approximately $9.3 million. The trial will be completed on or about December 2001.

Mr. Chairman, I will now provide you with an update of the VA National Survey of Persian Gulf Veterans authorized by Public Law 103–446. The National Survey is designed to determine the prevalence of symptoms and illnesses among a national random sampling of Gulf War veterans. The Survey is being conducted in three phases. Phase I was a population-based mail survey of the health of 30,000 randomly selected veterans from the Gulf War era (15,000 Gulf War veterans and 15,000 non-Gulf War veterans, males and females). The data collection phase is complete, analysis of the data continues, and the first report has been published in the scientific literature. Phase II consisted of a telephone interview of 2,000 non-respondents from Phase I (1,000 from each group) to determine if there are any response differences between respondents and non-respondents. Phase II is complete. In Phase III, 2,000 of the veterans who responded to the postal survey are being invited, along with their family members, to participate in a comprehensive physical examination protocol. These examinations are being conducted at 15 VA medical centers and involve specialized examinations including neurological, rheumatological, psychological, and pulmonological evaluations. When the National Survey is complete we will have a much clearer picture of the prevalence of symptoms and illnesses among Gulf War veterans.

The VA's Office of Research and Development awarded funds for Phase III of the National Health Survey of Persian Gulf Veterans in November 1998. Thus far, this study has examined approximately 1,600 veterans, plus 2,000 of their spouses and

children. The study will cost approximately $12 million and will complete patient recruitment in May of 2001.

The medical evaluations in Phase III are designed to determine:

—Whether Gulf War veterans have an increased prevalence of the following conditions frequently reported in the literature, compared to a control group of non-deployed veterans: Chronic Fatigue Syndrome (CFS); Fibromyalgia (FM); neurologic abnormalities, including peripheral neuropathy and cognitive dysfunction; and post-traumatic stress disorder (PTSD).

—Whether the specific medical conditions of arthritis, dermatitis, hypertension, bronchitis, and asthma, which have been reported more frequently among Gulf War veterans compared to non-deployed veterans, are at higher prevalence among deployed Gulf War veterans upon objective clinical examination.

—Whether the prevalence of any of these conditions is greater among the spouses of Gulf War veterans than among spouses of non-deployed veterans.

—Whether the prevalence of medical conditions and major birth defects found on a pediatric physical examination in the children conceived after the war is greater for Gulf War veterans than for non-deployed veterans.

Recently, Gulf War veterans have voiced concerns about a possible association between amyotrophic lateral sclerosis (ALS) and service in the war. Although there is no clear indication of an excess rate of ALS among Gulf veterans, the available data could represent an underestimate of the actual rate. Furthermore, preliminary data suggested that the age distribution of cases of ALS in Gulf veterans appeared to be younger than the age distribution of cases of ALS in the general U.S. population. Accordingly, VA is leading a research effort to identify all cases of ALS, or other motor-neuron diseases, occurring among Gulf War veterans. VA is collaborating with DOD, CDC, and various university disease experts to determine the veterans' health status and to describe their exposures to potential causal and risk factors for ALS, based on clinical examinations at VA or non-VA centers of excellence in neurologic diseases. This initial case-finding effort is ongoing, and is planned to continue through February 2001. This study should provide the most definitive information about the rate of ALS among Gulf veterans, and the age distribution of the diagnosed patients.

Other Research Initiatives on Illnesses in Gulf War Veterans

The research program has yielded several important results. Some of the highlights of recent research findings include:

—Population-based epidemiological studies have shown that Gulf War veterans report more symptoms than non-deployed veterans of the same era.

—The population-based study of Gulf War veterans in Iowa has shown that nearly 90 percent of Gulf War veterans reported their health status as "good" to "excellent," while the remainder rated their health status as "fair" to "poor," using standard measures of health status. A minority of them (14 percent) experienced a significant decline in their health status. Declines were noted in physical functioning and social functioning, while mental health scales showed improvement.

—Several major studies suggest that Gulf War veterans do not suffer from a unique, previously-unrecognized syndrome. In particular, four studies have evaluated the health of thousands of Gulf War veterans who served in: (a) the U.S. Air Force; (b) the U.S. Navy; (c) all three U.S. services; and (d) all three services from Great Britain. In each study, Gulf War veterans and comparison groups of non-deployed veterans reported the same patterns of symptoms. The results of these four studies are consistent with IOM's conclusion that "Thus far, there is insufficient evidence to classify veterans' symptoms as a new syndrome." IOM also concluded "All Gulf War veterans do not experience the same array of symptoms . . . Thus, the nature of the symptoms suffered by many Gulf War veterans does not point to an obvious diagnosis, etiology, or standard treatment." This is also consistent with the SIU report, which stated that "What SIU investigation found almost from the beginning was that the concept of a 'syndrome' does not accurately describe what is collectively referred to as 'Gulf War illnesses.' Instead, these veterans experience a variety of symptoms, illnesses, and disorders that do not appear to fit a particular pattern."

—The RWG has determined that population based longitudinal studies to determine the long-term health of Gulf War veterans are a high priority. There are two population based longitudinal studies underway that are supported by DOD and the Centers for Disease Prevention and Control (CDC). They are Iowa (CDC and DOD), and the United Kingdom (U.S. DOD). Altogether, these two studies are following up a total of approximately 12,000 veterans. Each of these studies has used questionnaires, including physical symptoms, psychological symptoms,

and exposures during the Gulf War. Both the Iowa and United Kingdom studies have included comprehensive medical histories and physical examinations. VA will request proposals to conduct a pilot of a longitudinal study based on its National Gulf War Survey.

—Neurobehavioral studies of Gulf War veterans and control populations suggest that some Gulf War veterans may have brain function abnormalities in such areas as memory, cognition, and motor control. The current RWG research portfolio includes seven studies using methods of sophisticated brain imaging such as conventional and functional magnetic resonance imaging (fMRI), and magnetic resonance spectroscopy.

—VA has developed a plan to establish two new Centers for the Study of War-Related Illnesses. These new Centers will assist VA in the development of appropriate preventive strategies to minimize illness and injury following future conflicts, including both combat and peace-keeping operations, and to develop new approaches for improving the care of active-duty and veteran patients with war-related illnesses. VA has released its Request for Proposal for these new Centers and plans to fund them within the next few months.

—In early 2000, DOD published Broad Agency Announcements to announce the availability of research funding on four topics. The selection and awarding of funds will be completed by the end of 2000. The topics are:

1. Toxicity of heavy metals that are relevant to the military, including DU;
2. Biomarkers to assess toxic chemical exposures and health effects;
3. Consequences of deployment stress on health and performance; and
4. Physiologically based methods to assess health consequences of deployment.

CONCLUSIONS

As the Federal research program continues to provide more results, we will substantially increase our understanding of Gulf War veterans' illnesses, which, in turn, will enhance our ability to diagnose and treat them. In addition, this newly gained knowledge will enhance prevention and intervention in illnesses in participants of future deployments.

Mr. Chairman, thank you again for permitting me this opportunity to summarize our work to date so that, using science, we may better understand the health problems of Gulf War veterans. You have my assurance that we will continue this effort to resolve or ameliorate health problems in this population to the greatest extent possible. Mr. Chairman, I will conclude my testimony here and am happy to answer any questions you or other Committee members may have.

Senator SPECTER. We have been joined by our distinguished colleague from Washington.

Senator Gorton, would you care to make any comments at this time?

Senator GORTON. No, thank you.

STATEMENT OF DRUE H. BARRETT, Ph.D., CHIEF, HEALTH ACTIVITY WORKING GROUP, CENTERS FOR DISEASE CONTROL AND PREVENTION, DEPARTMENT OF HEALTH AND HUMAN SERVICES

Senator SPECTER. Then we will move now to our third witness, Dr. Drue Barrett, who serves as the Center for Disease Control's liaison to the Department of Health and Human Services. Dr. Barrett is the chief of the Veterans Health Activity Working Group in the Division of Environmental Hazards and Health Effects at the National Center for Environmental Health.

That is quite a litany, Dr. Barrett. The floor is yours.

Dr. BARRETT. Thank you. Mr. Chairman, Senator Hutchison, Senator Gorton, thank you for the opportunity to be here and to discuss the recent Institute of Medicine report, and also to update the committee on the Centers for Disease Control and Prevention's research activities dealing with Gulf war veterans' illnesses.

I will focus my testimony on the discussion of the IOM report. But first I would like to provide some background information on

the types of studies that have been initiated to investigate Gulf war veterans' health concerns. Efforts to investigate Gulf war veterans's health concerns have included population-based studies, including cross-sectional and longitudinal cohort studies, cluster and cross-sectional studies of specific military units, commands, or branches of service, and studies of United States and other coalition forces.

Control subjects have been assessed in order to compare prevalence rates across groups. Assessment approaches have included mail and telephone surveys, in-person questionnaires, and physical examinations. The number of respondents participating in these various studies have ranged from a few hundred to over 20,000. Response rates have ranged from very poor, at 31 percent, to very good, at 76 percent.

The findings have been very consistent, regardless of the types of studies that have been used. We find that active duty and reserve personnel deployed to the Gulf war nearly all report self-assessed symptoms at a higher rate than comparison groups. Gulf war veterans are also more likely to rate their overall health status since the Gulf war as poorer than their nondeployed peers. However, few studies have been able to document abnormalities on physical examination and routine laboratory tests.

A number of different environmental exposures have been mentioned with regard to the Gulf war. There have been several studies that have explored the relationship between these exposures and subsequent health outcomes. However, as noted by the Institute of Medicine, this research has been hampered by a lack of objective exposure data. And so most of the studies have had to rely on self-reported health outcomes and self-reported exposures, which creates difficulty in studying these issues.

To date, no specific exposure has been identified that would be responsible for the various types of problems that are being reported by Gulf war veterans. In an effort to further examine the relationship between health effects and exposures, the Institute of Medicine reviewed the scientific and medical literature on depleted uranium, sarin, pyridostigmine bromide, and vaccines.

Because of the lack of exposure data among Gulf war veterans, the committee was not able to assess the likelihood that Gulf war veterans' health problems are associated with or caused by these agents. Instead, most of the conclusions in the report are based on occupational and clinical exposures.

As the chairman of the IOM committee is here to discuss the report, I will not focus on any of the findings of the report. What I would like to do is just comment on some of the methods used by the IOM.

The IOM targeted the exposures of greatest concern to Gulf war veterans, as determined by meetings with veterans. They based their conclusions on an extensive review of scientifically reviewed articles. They used rigorous, well-established methods for evaluating the strength of the evidence for determining the association between studied exposures and health outcomes. This included examining the strength of the association, the dose response relationship, the consistency of the association, the temporal relationship

between exposure and outcome, the specificity of the association, and biological plausibility.

They also considered alternative explanations, such as chance and various forms of bias. The IOM critically examined each study and considered specific study design elements, such as the method of exposure assessment, sample size, length of follow-up, and control of confounding variables. Similar review methods have been used previously by IOM committees in studying other health issues.

Although the IOM findings cannot provide conclusive answers about the health impact of these exposures on Gulf war veterans, this report may provide some reassurance that among other populations there does not seem to be strong evidence that these exposures are associated with long-term health effects, especially in the absence of acute effects.

PREPARED STATEMENT

Mr. Chairman, I refer you to my written testimony for a review of CDC's Gulf war research activities and how we have coordinated our efforts with the other responsible departments. And I will be happy to answer any questions.

Senator SPECTER. Thank you very much, Dr. Barrett.

[The statement follows:]

PREPARED STATEMENT OF DRUE H. BARRETT

Mr.Chairman, thank you for the opportunity to update the Subcommittee on the Centers for Disease Control and Prevention's (CDC) research programs pertaining to Gulf War veterans' illnesses. I am Dr. Drue Barrett, Chief of the Veterans' Health Activity Working Group in the Division of Environmental Hazards and Health Effects of the National Center for Environmental Health (NCEH). I serve as CDC's liaison to the Department of Health and Human Services (HHS) on Gulf War issues. I am a member of the Research Working Group that serves the Persian Gulf Veterans Coordinating Board and the Military and Veterans Health Coordinating Board. NCEH has been designated as the lead Center at CDC for addressing Gulf War veterans' health concerns; however other Centers within CDC have also been involved in this effort, most notably, the National Center for Infectious Diseases.

My testimony will include: (1) a discussion of the recent Institute of Medicine (IOM) report on depleted uranium, sarin, pyridostigmine bromide, and vaccines; (2) a review of CDC's Gulf War research activities; and (3) an assessment of the Federal research effort to address the health concerns of Gulf War veterans.

BACKGROUND

Shortly after the end of the Gulf War, reports began to emerge that veterans were experiencing a variety of somatic symptoms generally not accompanied by physical signs or laboratory abnormalities. The most commonly reported symptoms include complaints of chronic fatigue, headache, muscle and joint aches and pains, and cognitive disturbances.

In 1994, the findings of a National Institutes of Health Technology Assessment Workshop established the priority of conducting controlled epidemiologic research to determine the prevalence of symptoms among Gulf War veterans and a number of such studies have been completed. This research effort has included population-based studies, including cross-sectional and longitudinal cohort studies; cluster and cross-sectional studies of specific military units, commands, or branches of service; and studies of U.S. and other coalition forces. Importantly, control subjects have been assessed in order to compare prevalence rates across groups. These control groups have included military personnel activated during the time of the Gulf War who remained stateside, troops deployed to other regions during the Gulf War, and military participants in other conflicts. Assessment approaches have included mail and telephone surveys, in person questionnaires and interviews, and physical examinations. The number of respondents participating in these studies have ranged

from a few hundred to over 20,000. Response rates have ranged from poor (31 percent) to very good (76 percent).

The findings of these studies have been remarkably consistent, regardless of the study methodology employed. Active duty and reserve personnel deployed to the Gulf War report nearly all assessed symptoms at a higher rate than comparison groups. Gulf War veterans are also more likely to rate their overall health status since the Gulf War as poorer than their non-deployed peers. The most useful or generalizable studies of symptom prevalence have been population-based, have used a comparable control group of military era personnel not deployed to the Gulf, and have used at least some standardized or validated instruments to allow comparisons to other populations or studies.

A number of environmental exposures have been mentioned in relation to Gulf War veterans' health concerns. These have included environmental and occupational pollutants (e.g., sand, petroleum products, pesticides, Chemical Agent Resistant Coating paint, smoke from oil-well fires), medical prophylaxes (e.g., anthrax and botulinum toxin vaccines and pyridostigmine bromide), depleted uranium munitions, and biologic and chemical warfare agents. Several studies have explored the relationship between exposures during the Gulf War and subsequent health outcomes. However, as noted by the IOM in their recent report, this research has been hampered by a lack of objective exposure data. Since most studies have examined the association between retrospective recall of exposures and self-reported health outcomes, it has been difficult to eliminate the impact of potential recall bias. To date, no specific exposure has been identified as responsible for the various health complaints of Gulf War veterans.

IOM REPORT ON GULF WAR EXPOSURES AND HEALTH

In an effort to further examine the health effects associated with exposures encountered during the Gulf War, the IOM reviewed the scientific and medical literature on depleted uranium, sarin, pyridostigmine bromide, and vaccination against botulinum toxin and anthrax. Because of the lack of data on actual exposures among Gulf War veterans, the committee was not able to assess the likelihood that Gulf War veterans' health problems are associated with or caused by these agents. Instead most of the conclusions in the report are based on occupational and clinical exposures. Overall the committee found that there was not enough evidence to link long-term health problems with exposure to agents known to be present during the Gulf War. At most the committee found limited evidence from three studies that might suggest an association between sarin and long-term health effects. Alternative explanations for any possible association could not be ruled out. The committee found sufficient evidence for short-term health effects associated with high doses of pyridostigmine bromide and anthrax botulinum toxoid vaccinations. Pyridostigmine bromide was found to be associated with transient, tolerable, and mild gastrointestinal and muscular symptoms, and the anthrax and botulinum toxoid vaccinations were found to be associated with redness, swelling, and tenderness at the site of injections among other mild and short-term symptoms.

The IOM based their conclusions on an exhaustive review of 1,000 peer reviewed journal articles. They used rigorous, well-established methods for evaluating the strength of the evidence for determining the association between the studied exposures and health outcomes. This included examining the strength of the association, the dose-response relationship, the consistency of the association, the temporal relationship between exposure and outcome, the specificity of the association, and biological plausibility. They also considered other alternative explanations such as chance and various forms of bias. The IOM critically examined each study and considered specific study design elements, such as method of exposure assessment, sample size, length of follow-up, and control of confounding variables. Similar review methods have been used previously by IOM committees studying other health issues, such as vaccine safety, herbicides used in Vietnam, and indoor pollutants related to asthma. Although the IOM findings cannot provide conclusive answers about the health impact of depleted uranium, sarin, pyridostigmine bromide, and vaccines on Gulf War veterans, this report may provide some reassurance that among other populations there does not seem to be strong evidence that in the absence of acute effects these exposures are associated with long term health effects.

CDC-FUNDED GULF WAR STUDIES:

In order to further explore what is known about Gulf War veterans' health concerns, I would like to review CDC's research activities in this area. CDC's initial efforts were to examine the health impact of the oil well fires. Researchers from the NCEH and several other Federal agencies conducted cross-sectional surveys of

workers in Kuwait City in May 1991 and of firefighters in the oil fields in October 1991. Blood samples were tested for 31 volatile organic compounds (VOCs) and compared to a referent group of persons living in the United States collected as part of the third National Health and Nutrition Examination Survey (NHANES III). The median concentration of VOCs among the firefighters was quite elevated. However, among the non-firefighting personnel, VOC concentrations were equal to or lower than the levels found among the reference group.

NCEH also collaborated with the Department of Defense (DOD) in a study of 30 members of an Army Unit located in Germany. Blood from these military personnel was tested for VOCs at three points in time, prior, during and after their deployment to Kuwait. Only one compound, tetrachloroethylene, was found to be elevated. This is a compound found in degreasing agents used to clean equipment.

In 1994, CDC collaborated with the Mississippi Department of Health and the Department of Veterans Affairs (VA) on an assessment of reports of adverse birth outcomes among members of two Mississippi National Guard Units that served in the Gulf War. This investigation found no increase above expected rates in the total number of birth defects, or the frequency of premature birth and low birth weight. The frequency of other health problems such as respiratory infections, gastroenteritis, and skin diseases among children born to these veterans also did not appear to be elevated. Due to the small sample size, this investigation was unable to assess individual categories of birth defects.

In 1994, CDC initiated an epidemiologic study of Gulf War veterans from Iowa. The Iowa study, conducted in collaboration with the Iowa Department of Public Health and the University of Iowa, was one of the first population-based epidemiologic studies to document that Gulf War veterans are reporting more medical and psychiatric conditions than their non-deployed military peers. In fact, this study was recently described by IOM as "perhaps the strongest study on Gulf War veterans' experience of symptoms related to deployment in the Gulf." The 3,695 subjects who completed this study were selected from a larger population of almost 29,000 military personnel who listed Iowa as their home of record. Furthermore, the subjects in this study were specifically selected to represent individuals from all four branches of the military, and include both regular military personnel and National Guard and reservists. Seventy-six percent of the eligible study subjects completed the detailed telephone interviews. This study is also one of the first controlled epidemiological studies to evaluate the health consequences of the Gulf War. The study included a carefully selected comparison group of military personnel who were not deployed to the Persian Gulf but who served during the time of the Gulf War. The Iowa study found that the Gulf War military personnel were more likely than those who did not serve in the Gulf War to report symptoms suggestive of cognitive dysfunction, depression, chronic fatigue, post-traumatic stress disorder, and respiratory illness (asthma and bronchitis). The conditions identified in this study appear to have had a measurable impact on the functional activity and daily lives of these Gulf War veterans. Among Gulf War veterans, minimal differences were observed between the National Guard or reserve troops and the regular military personnel. The results of the Iowa study were published in the "Journal of the American Medical Association" in 1997.

More recently the Iowa data has been examined to determine whether the health complaints of Gulf War veterans represent a novel illness unique to service in the Persian Gulf. We assumed that if there was a Gulf War syndrome, the symptom pattern would vary between the deployed veterans and the non-deployed controls. Although Gulf War veterans reported nearly every symptom more often than those who did not deploy to the Gulf, we found that Gulf War veterans and non-deployed controls had the same patterns of symptoms suggesting that the health complaints of Gulf War veterans are similar to those of the general military population and are not consistent with the existence of a unique Gulf War syndrome. This study was published earlier this year in the "American Journal of Medicine."

Also in 1994, CDC initiated a study of Air Force personnel. This study organized symptoms reported by Air Force Gulf War veterans into a working case definition, characterized clinical features, and evaluated risk factors. The cross-sectional questionnaire was sent to 3,723 currently active volunteers from four Air Force populations. Clinical evaluations were performed on 158 Gulf War veterans from one unit, irrespective of health status. A case was defined based on reporting one or more chronic symptoms from at least 2 of 3 categories (fatigue, mood-cognition and musculoskeletal) and was further characterized as mild-to- moderate or severe depending on the severity of the reported symptoms. The prevalence of mild-to-moderate and severe cases were 39 percent and 6 percent, respectively, among 1,155 Gulf War veterans versus 14 percent and 0.7 percent among 2,520 non-deployed veterans. Fifty-nine (37 percent) clinically evaluated Gulf War veterans were non-cases,

86 (54 percent) were mild-to-moderate cases and 13 (8 percent) were severe cases. The key observation of the study was that Air Force Gulf War veterans were significantly more likely to meet criteria for severe and mild-to-moderate illness than were non- deployed personnel. There was no association between the chronic multisymptom illness and risk factors specific to combat in the Gulf War (month of season of deployment, duration of deployment, duties in the Gulf War, direct participation in combat, or locality of Gulf War service). The finding that 15 percent of non-deployed veterans also met illness criteria was equally important and suggests that the multisymptom illness observed in this population is not unique to Gulf War service. The clinical evaluation component of the study found that neither mild-to-moderate nor severe cases were associated with clinically significant abnormalities on physical examination or routine laboratory tests. However, Gulf War veterans classified as having mild-to-moderate and severe illness had a significant decrease in functioning and well-being compared with non-cases. The results from this study were published in CDC's "Morbidity and Mortality Weekly Report" in 1995 and in the "Journal of the American Medical Association" in 1998.

Subsequent analyses of data from the Air Force study have examined the association between physical, chemical, and emotional deployment stressors reported by Gulf War veterans and the development of chronic multisymptom illness following the war. The illness defined in this study was found to be related to reporting pyridostigmine bromide use, insect repellent use, injuries that required medical attention, and a belief that biological or chemical weapons had been used. These findings were published earlier this year in the "Journal of Nervous and Mental Disorders."

CDC is currently funding a follow-up to the Iowa study focusing on evaluating self-reported symptoms of asthma. This study involves a detailed clinical evaluation of a sample of subjects who completed the initial telephone survey. This evaluation includes a physical examination; tests of lung functioning; questions regarding medical, occupational, and exposure history; assessment of functional status and quality of life; and assessment of psychiatric history and personality functioning. The examinations are being conducted at the University of Iowa Hospitals and Clinics in Iowa City, Iowa. This study is in its final phases of data collection.

The University of Iowa has also been funded by DOD to conduct validation studies of additional health outcomes among participants of the telephone survey. These include validation of depression, cognitive dysfunction, and fibromyalgia. CDC is providing technical assistance to DOD and the University of Iowa for this study.

We are also funding the Boston University School of Public Health to conduct a study examining the relationship between cognitive function and symptom patterns among Gulf War veterans. In one component of this study, functional magnetic resonance imaging (fMRI) is being used to examine possible differences in brain activation patterns between Gulf War veterans and era controls with different levels of symptoms. A second component of the study is using a new data-driven mathematical technique, Logical Analysis of Data, to examine how Gulf War veterans' symptoms cluster together. This may provide useful information for determining etiology or for developing a working case definition. Finally, this study also includes a component examining the neuropsychological functioning of a sample of Danish Gulf War troops. Investigators are currently in the data collection phase for the fMRI component of this study and in the data analysis phase for the other two components. We anticipate that this study will be complete by the end of this year.

Finally, CDC is funding the University of Medicine and Dentistry of New Jersey-Robert Wood Johnson Medical School to conduct a study examining case definition issues. The study will assess the persistence and stability of Gulf War veterans symptoms over time, compare the performance of data-driven case definitions to existing definitions for medically unexplained symptoms, and examine the role of psychiatric conditions in Gulf War veterans' unexplained illnesses. We originally expected that this study would be completed in late 2000, however the process of protocol development and clearance took somewhat longer than we anticipated. Thus, we expect that this study will require an additional year to complete.

CDC is also collaborating with DOD and VA on a number of projects including a study of health outcomes among Saudi Arabia National Guard members and a study of Amyotrophic Lateral Sclerosis (ALS) among Gulf War veterans. This collaboration has included providing input on study protocols, reviewing human subjects issues, and assisting in laboratory assessments.

RESEARCH PLANNING CONFERENCE

CDC, in collaboration with other the Office of Public Health and Science, the National Institutes of Health (NIH), and the Agency for Toxic Substances and Disease

Registry (ATSDR), recently sponsored a conference to develop future Gulf War research recommendations. On February 28 through March 2, 1999, CDC brought together scientists, clinicians, veterans, veterans' service organizations, Congressional staff, and other interested parties to discuss and make recommendations regarding the direction of future research on undiagnosed illnesses among Gulf War veterans and their links with multiple chemical and environmental exposures.

Concurrent workgroups were convened in order to develop research recommendations in four areas: pathophysiology, etiology, and mechanisms of action; assessment and diagnosis of illnesses; treatment; and prevention of illnesses in future deployments. This conference highlighted the importance of including veterans in the process of planning and implementing research. Veterans and scientists alike expressed that they found the process useful and that future similar efforts should be encouraged. A report was released earlier this year that summarized the outcome of each of the four workgroup sessions. The recommendations developed at this conference have been shared with the interagency Research Working Group and need to be considered in light of the existing research portfolio in order to avoid unnecessary duplication of efforts. We are currently developing a call for research proposals that will build on the recommendations developed during the conference. We would specifically like to address the issue of health risk communication and the development of more effective methods for delivering deployment-related health information.

ASSESSMENT OF FEDERAL RESEARCH EFFORT

The Federal research portfolio on Gulf War veterans' illnesses has been managed by the Research Working Group of the Persian Gulf Veterans Coordinating Board and in the near future will be managed by the Military and Veterans' Health Coordinating Board. Various agencies within HHS, such as CDC, NIH, and ATSDR, have participated in the interagency effort to coordinate research, however the majority of this research has been funded by DOD and VA. To date there have been 192 federally-funded research projects on Gulf War veterans' illnesses. These projects represent a broad spectrum of research efforts, ranging from small pilot studies to large-scale epidemiology studies addressing mechanistic, clinical, and epidemiological issues. Similar efforts have been initiated in other coalition countries, most notably in the United Kingdom and Canada. Many of the projects are ongoing and we eagerly await the results of these studies. In addition to the Federal research effort, numerous independent review panels and expert committees, such as the IOM committees, have evaluated the available data on Gulf War veterans' illnesses. Despite these extensive research and review efforts, many questions remain regarding the health impact of the Gulf War. However, these remaining questions reflect the complexity of assessing and predicting the health impact of military deployments. Despite this complexity, the federal research effort continues in an effort to uncover the causes of illnesses among Gulf War veterans so that effective treatment approaches can be developed and similar illnesses in future deployments can be prevented.

Mr. Chairman, this concludes my testimony. I would be happy to answer any questions the Subcommittee may have.

STATEMENT OF ROBERT G. CLAYPOOL, M.D., EXECUTIVE DIRECTOR, MILITARY AND VETERANS HEALTH COORDINATING BOARD

Senator SPECTER. We now turn to Dr. Robert Claypool, Military and Veterans Health Coordinating Board's first executive director as of January 1 of this year, responsible for directing the activities of the staff which supports the co-chairs, namely the Secretaries of Defense, Health and Human Services, and VA.

Thank you for joining us, Dr. Claypool, and we look forward to your testimony.

Dr. CLAYPOOL. Mr. Chairman, Senator Hutchison, Senator Gorton, it gives me a great pleasure to be able to speak with you about the recent Institute of Medicine's report on Gulf war health. Before I do that, I would like to take a moment and familiarize you with the workings of the Persian Gulf Veterans Coordinating Board or PGVCB, which was established in 1994, and its role in coordinating Gulf war programs, including research on Gulf war veterans' illnesses.

I would also like to explain that I serve as the executive director of this board, as well as the Military and Veterans Health Coordinating Board or MVHCB, both of which, as you mentioned, Mr. Chairman, are co-chaired by the Secretaries of Defense, Health and Human Services, and Veterans Affairs. Whereas the PGVCB was established to focus on Gulf war veterans' issues, the MVHCB was built on the success of the Persian Gulf Board and looks ahead to enhance military personnel and veterans' health in future deployments. We are currently working on a plan to formally incorporate the functions and missions of the Persian Gulf Board into the Military and Veterans Health Coordinating Board.

On August 31, 1993, prior to the establishment of the Persian Gulf Veterans Coordinating Board, and in response to section 707 of Public Law 102–585, President Clinton designated the Secretary of VA to coordinate research funded by the executive branch of the Federal Government into the health consequences of service in the Gulf war. VA carries out its research coordinating role through the auspices of the Research Working Group of the PGVCB.

Each department's research management program for Gulf war veterans' illnesses has been linked through an overall policy and management coordination effort carried out by the Research Working Group. The Research Working Group makes recommendations for research funding through the management authority that each department maintains over its scientists and its scientific program managers who are responsible for research and its budgetary process.

In addition, each department has its own appropriation for biomedical research program. The PGVCB and the three working groups, including the Research Working Group, have no independent budget authority. Dr. Feussner has already provided specific information about the PGVCB research activities.

I mentioned that three different working groups support the PGVCB. These working groups are made up of members of the Department of Defense, the VA, and HHS. The PGVCB clinical working group oversees accomplishments related to medical care and clinical assessment, including coordinating the efforts between DOD's Comprehensive Clinical Evaluation Program or CCEP and the VA's Gulf war Health Registry, providing comparable clinical assessment questionnaires and physical and clinical laboratory examinations for each program.

Under the purview of the PGVCB, educational tools and programs were developed and medical articles were published to assist clinicians caring for Gulf war veterans and to help education patients and the public about Gulf war-related health issues. The PGVCB clinical working group became a model for exchanging ideas and progress between the three departments.

In addition, a comprehensive health risk communication guide was developed for use by each department to more effectively inform military personnel, veterans and their families of health-related issues associated with the Gulf war, as well as with future deployments.

The third working group, the Disability and Benefits Working Group or DBWG, developed guidelines sensitive to legally required documentation. Links were formed between the Department of De-

fense and the VA to facilitate a smoother transfer of health-related information between the two departments. The DBWG has also addressed the need for compensation for other serious conditions that have been diagnosed in some Gulf war veterans, such as amyotrophic lateral sclerosis or ALS.

Regarding the IOM study, I feel that the report is a comprehensive assessment of the peer-reviewed scientific literature. Its conclusions are consistent with my working knowledge of these exposure agents, as well as with the conclusions of previous review groups, such as the Presidential Advisory Committee on Gulf war veterans' illnesses. The IOM committee rendered opinions as to the causal or associative relationship between these agents and adverse health outcomes. It pointed out that detailed exposure information would facilitate the ability to link observed health concerns with those exposures.

In addition to other factors, I agree that knowing who was exposed to how much of what agent when and where are important data elements. Documentation of health encounters capturing personal exposure, and comprehensive environmental surveillance are all part of total medical situational awareness. This cognizance has become an essential component of deployment health.

The Military and Veterans Health Coordinating Board, which, as I mentioned, will include the functions of the Persian Gulf Veterans Coordinating Board, is working through the Deployment Health Working Group to assess, coordinate, and make recommendations that will resolve this kind of data deficiency.

PREPARED STATEMENT

As to the specific recommendations made in the IOM report regarding research needs, Dr. Feussner, as noted the chair of the RWG, has addressed these recommendations in detail in his testimony.

Mr. Chairman, thank you for the opportunity to speak with your committee today.

Senator SPECTER. Thank you very much, Dr. Claypool.

[The statement follows:]

PREPARED STATEMENT OF ROBERT G. CLAYPOOL

Mr. Chairman and members of the Subcommittee, thank you for this opportunity to speak with you today about the recent Institute of Medicine's (IOM) report on Gulf War Health, which examines possible associations between some of the agents to which Gulf War veterans may have been exposed and their potential for adverse health effects. Before I do that I would like to take a moment and familiarize you with the workings of the Persian Gulf Veterans Coordinating Board (PGVCB), which was established in 1994, and its role in coordinating Gulf War programs including research on Gulf War veterans' illnesses. I would also like to explain that I serve as the Executive Director of this Board as well as the Military and Veterans Health Coordinating Board (MVHCB), both of which are Co-Chaired by the Secretaries of Defense, Health and Human Services, and Veterans Affairs. Whereas the PGVCB was established to focus on Gulf War Veterans' issues, the MVHCB was built on the success of the PGVCB and looks ahead to enhance military personnel and veterans' health in future deployments. We are currently working on a plan to formally incorporate the functions and missions of the PGVCB into the MVHCB.

On August 31, 1993, prior to the establishment of the Persian Gulf Veterans Coordinating Board, and in response to section 707 of Public Law 102–585, President Clinton designated the Secretary of VA to coordinate research funded by the Executive Branch of the Federal Government into the health consequences of service in the Gulf War. VA carries out its research-coordinating role through the auspices of

the Research Working Group (RWG) of the PGVCB. Each Department's research management program for Gulf War veterans' illnesses research has been linked through an overall policy and management coordination effort carried out by the RWG. The RWG makes recommendations for research funding through the management authority that each department maintains over its scientists and its scientific program managers who are responsible for research and its budgetary process. In addition, each Department has its own appropriation for biomedical research programs. The PGVCB and its three working groups, including the RWG, have no independent budget authority. Dr. John Feussner has provided specific information about the PGVCB RWG research activities.

I have mentioned that three different working groups support the PGVCB. These working groups are made up of members of DOD, VA, and HHS. The PGVCB Clinical Working Group (CWG) oversees accomplishments related to medical care and clinical assessment including coordinating the efforts between DOD's Comprehensive Clinical Evaluation Program (CCEP) and the VA's Gulf War Health Registry; providing comparable clinical assessment questionnaires; and physical and clinical laboratory examinations for each program. Under the purview of the PGVCB, educational tools and programs were developed and medical articles were published to assist clinicians caring for Gulf War veterans and to help educate patients and the public about Gulf War-related health issues. The PGVCB Clinical Working Group became a model for exchanging ideas and progress between the three departments. In addition, a comprehensive health-risk communication guide was developed for use by each department to more effectively inform military personnel, veterans, and their families of health-related issues associated with the Gulf War, as well as with future deployments.

The third working group, the PGVCB's Disability and Benefits Working Group (DBWG), developed guidelines sensitive to legally required documentation. Links were formed between DOD and the VA to facilitate a smoother transfer of health-related information between the two departments. The DBWG has also addressed the need for compensation for other serious conditions that have been diagnosed in some Gulf War veterans, such as amyotrophic lateral sclerosis (ALS).

Regarding the IOM study, I feel that the report is a comprehensive assessment of the peer-reviewed, scientific literature. Its conclusions regarding the evidence for both transient and long-term health effects associated with sarin, depleted uranium, pryidostigmine bromide, and vaccines are consistent with my working knowledge of these exposure agents as well as the conclusions of previous review groups, such as the Presidential Advisory Committee on Gulf War Veterans' illnesses. The committee rendered opinions as to the causal or associative relationship between these agents and adverse health outcomes. It pointed out that detailed exposure information would facilitate ability to link observed health concerns with those exposures. In addition to other factors, I agree that knowing who was exposed to how much of what agent when and where are important data elements. Documentation of health encounters, capturing personal exposure, and comprehensive environmental surveillance are all part of total medical situational awareness. This cognizance has become an essential component of deployment health. The Military and Veterans Health Coordinating Board (MVHCB), which includes the functions of the Persian Gulf Veterans Coordinating Board, is working through the Deployment Health Working Group to assess, coordinate, and make recommendations that will resolve this kind of data deficiency.

As to the specific recommendations made in the IOM report regarding future research needs, I am confident that the Gulf War research program will adequately address each recommendation. Dr. Feussner, the Chair of the PGVCB RWG, addresses each of the IOM recommendations in detail in his testimony presented here today.

Mr. Chairman, thank you, again for the opportunity to speak with the Subcommittee today.

Senator SPECTER. We will now proceed with questions from the senators. And we will have 5-minute rounds.

Dr. Barrett, the Iowa study conducted by the Centers for Disease Control has been summarized as finding that the Gulf war military personnel were more likely than those that did not serve in the Gulf war to report symptoms suggestive of cognitive dysfunction, depression, chronic fatigue, post-traumatic stress disorder, and respiratory illness.

When you have a finding more likely than not, that satisfies the civil burden of proof, preponderance of the evidence. Does that in your professional judgment establish a finding that exposure to these toxic substances did in fact cause Gulf war syndrome?

Dr. BARRETT. Well, I think the first point that is important is the Iowa study was conducted as a telephone survey. So it did not involve, at that point, doing any physical examinations. And it was just reporting on trying to get an idea——

Senator SPECTER. We have a lot of telephone surveys in this day and age. That is about all we do. They call them polls——

Dr. BARRETT. Well, there is some——

Senator SPECTER [continuing]. In one respect.

Dr. BARRETT. There is follow-up that is going on.

Senator SPECTER. Excuse me. What is wrong with the telephone survey?

Dr. BARRETT. Well, the point of the Iowa study was to get a handle on the prevalence and adverse health outcomes among those who went to the Gulf in comparison to those who did not. So the point was to assess a variety of different types of health outcomes. What we are currently doing is follow-up on that cohort to bring people in to do objective testing to see how the self report of symptoms compares with findings on physical examinations.

Senator SPECTER. How many people were surveyed?

Dr. BARRETT. There were approximately 3,700 people who were surveyed.

Senator SPECTER. Well, that is a pretty good-sized survey. The concern that I have is when are we going to finish the studies, and when are we going to finish the task. This is a 300-page report, which cost a lot of money, conducted by the Veterans Affairs Committee in the 105th Congress. And we came to the conclusion here—we will try to talk over that noise.

The conclusion here was that the evidence, the medical evidence, was not really very definitive. But the practical sense consequence was that there is a pragmatic causal relationship between exposure to these toxic substances and all of these ailments.

Senator Hutchison commented about that in her remarks. I certainly have found that in a series of hearings in Pennsylvania and people that we have talked to here.

Dr. Rostker, as a principal DOD official in charge——

Dr. ROSTKER. We——

Senator SPECTER. You have not gotten the question yet, Dr. Rostker.

How many more studies are we going to have? What is the point? Have we not really already established in a pragmatic sense the cause and effect of the exposure to these toxic substances in Gulf war syndrome?

Dr. ROSTKER. Sir, we recognize that those who served in the Gulf have a higher rate of reporting illnesses. We do not understand what that is associated to. You talked about a number——

Senator SPECTER. What do you mean, not associated to? They served in the Gulf war.

Dr. ROSTKER. And you defined the Gulf war in terms of a number of toxins. An additional factor in the Gulf war was stress. There are other unknown factors that could have been attributed to the

Gulf war. I do not dispute that those who served in the Gulf war are reporting illness at a higher rate. I cannot make the conclusion that you are willing to make, that it is because of exposure to a specific list, definitive list, of toxins.

Senator SPECTER. Dr. Barrett testified that there is a "lack of objective exposure data." Well, that is never going to improve. We are never going to have any better data after the year 2000 from what happened in 1991.

Dr. Feussner, final question. My yellow light is about to expire to a red light. As a practical consequence, are the Gulf war veterans who complain of this long list of maladies being treated and served by the Veterans Administration on the current state of the record without a greater finding of cause and effect?

Dr. FEUSSNER. Yes, I think that is correct. I think what the Iowa study—well, to answer your question first, I think that veterans who are presenting to VA with a variety of symptoms are having those symptoms treated.

In addition to that, VA and DOD, in addition to the standard treatment that you might receive for some of these symptoms and clinical problems, the DOD and VA have mounted two specific treatment trials that look at other aspects of Gulf war veterans' illness, one looking at the use of antibiotics to treat the illness complex, and another looking at behavioral therapy and exercise therapy. So that in addition to standard therapy, there are clinical trials going on looking at new treatment strategies. The clinical trials will be finished next summer. They involved hundreds, and even thousands, of veterans.

I think you are correct, that information about exposures is never going to be better, certainly could not be better 10 years after the exposure took place. That seriously compromises the ease with which the research effort can go forward in identifying a causal relationship.

The other issue that is difficult is that the IOM noted, for example with uranium, that in populations that have known exposures for known periods of time, it frequently will take decades to track those patients because of the latency of illness developing after a known exposure. In the Gulf war veteran cohort, we are dealing with unknown doses of exposures.

But those doses are likely to be low and of short duration. It is more difficult to tease out long-term consequences of low-dose and short-duration exposures than acute effects of known high-dose exposures.

Senator SPECTER. Thank you very much, Dr. Feussner. My red light went on in the middle of your answer. So I am going to yield now to Senator Hutchison.

Senator HUTCHISON. Well, thank you, Mr. Chairman. Are you going to allow a second round, also?

Senator SPECTER. I do not think so. But take what time you need now, Senator.

Senator HUTCHISON. OK. I have several questions of different members of the panel. And I wanted to establish a couple of things. Let me start with Dr. Barrett.

The Centers for Disease Control has a classic manual for field investigations. It is in a book, actually, entitled, Field Epidemiology.

I am sure you are familiar with this. I understand that the classic approach that the CDC uses is outlined in this book. And it is fairly simple. You take up—first you get a case definition of your disease. You find a convenient group where you separate them into people who have symptoms and people who do not who were in the same group. Then you analyze the data, and you find out which risk factors were effective. And then you go through the steps.

And it is my understanding that this is how you found the cause of toxic shock syndrome and Legionnaire's disease. I want to ask you if you think that enough of this kind of approach has been done for the Desert Storm disease.

Dr. BARRETT. Let me discuss CDC's Air Force study, because I think it follows this classic model that you are talking about. It was conducted at the end of 1994. There was some thought that there was excessive illness among a particular Air National Guard unit in the State of Pennsylvania. And the State of Pennsylvania, along with the Department of Veterans Affairs and the Department of Defense, invited the CDC in to do an investigation. CDC then followed the classic model of first going in and doing a very careful clinical examination of the most characteristic patients. That process found that veterans were reporting symptoms, such as fatigue and aches and pains. But the initial evaluations, clinical evaluations, were not able to identify any findings on physical examination or routine laboratory tests.

The next step that we did was to collect information on those who went to the Gulf versus those who did not go to the Gulf, collecting much more detailed information about the types of symptoms that were being reported and trying to get information on the various types of experiences that occurred while in the Gulf. This included looking at this particular index unit, but also comparing three different control units.

That step was used to develop a working case definition. I think what was important that came out of this case definition is that illness was not unique to those who were deployed to the Gulf. In fact, about 45 percent of those who were deployed to the Gulf met this case definition. About 15 percent of those who did not go to the Gulf also met the case definition. So clearly, we are dealing with something that is not specific to deployment in the Gulf.

They then took a——

Senator HUTCHISON. In that particular unit. But do you think this has been employed throughout the United States with other groups that—one in seven is not psychosomatic. There is something here. And I do not question how much money we have spent. I do question that we do not have definitive results.

Dr. BARRETT. Right.

Senator HUTCHISON. And I do question that we do not seem to be willing to say that there is a Desert Storm disease and then go forward with the techniques that we need to use to find—maybe there are several different causes. I think Dr. Haley's examinations have shown that there might be three factors that would go into one disease. But it seems like we could get beyond the simplicity of saying it is all amorphous, and we just cannot say that there is a syndrome here. One in seven, I am willing to state for the record is a syndrome, one in seven.

Dr. BARRETT. This has also been looked at in the Iowa study as well, this issue of is there a syndrome. And——

Senator HUTCHISON. Iowa and Pennsylvania. Are there others?

Dr. BARRETT. And it has been—the idea of whether there is a syndrome has been looked at in at least four different studies. The approach that has been used to identify a definition is a little different than is used in classical approaches, that usually when you do a clinical investigation, it can point you in the direction of what is the source of the illness and what is the agent that you are looking at. In this case, those types of clinical evaluations are not pointing us in any particular direction.

So people have gotten somewhat innovative and have turned to statistical approaches, and specifically factor analysis. And that has been used in several different studies. The Iowa study just recently published findings on its data and finds, very similar to what the Air Force study found, that when you look at both Gulf war veterans and nondeployed veterans, you are finding similar clusterings of symptoms. So it does not appear that this is representing a unique syndrome.

Senator HUTCHISON. Well, let me just say that I think your methods have been proven in the past. And maybe 4 in the last 10 years may not be enough. And I would like to see us perhaps pursue some of that.

Let me ask another question to Dr. Feussner. And this may have an impact on how much cooperation you are getting.

I understand that you are looking in the very early stages of the number of younger Gulf war vets who are coming up with Lou Gehrig's disease, and that—I am not being scientific here, but that you are beginning to see that maybe there are 40 to 50 cases in a group of Gulf war veterans versus the general population, which would be 20 or 25, enough that you are pursuing, as I understand, to see if there is a higher incidence.

But then I get a copy of the VA research consent form, which says "if you are receiving compensation for an undiagnosed illness," which is how many of the people who have Desert Storm syndrome are classified, and they are getting compensation and treatment, because it is undefined, "participation in our study may result in the loss of those benefits, if you are diagnosed with Lou Gehrig's disease. VA regulations require that this study consent form be filed in the veteran's VA medical records. Therefore, we can't guarantee VA benefits. And the administration will not learn of any of this information nor that any benefits that you may be receiving will not be affected as a result of that knowledge."

Now, I just want to ask you if you think that there is not a double incentive here for people not to participate in a very valid question that you are asking to see if perhaps this may be causally connected to a debilitating, horrible disease known as Lou Gehrig's disease.

Dr. FEUSSNER. Would you like me to start with the study or the consent form, Senator?

Senator HUTCHISON. Well, I would like for you to answer——

Dr. FEUSSNER. OK.

Senator HUTCHISON [continuing]. How this consent form would allow you to have a study.

Dr. FEUSSNER. Well, let me say that a Member of Congress and I met with a group of veterans in Atlanta in early March. And the veterans raised concern about this question of Lou Gehrig's disease. Amyotrophic lateral sclerosis is a very rare disease. The prevalence of this disease is about 3 or 4 per 100,000. It is a very difficult disease to study because it is rare, and there is no treatment for this disease.

The veterans were concerned that there might be an excess risk of getting this disease because of their service in the Gulf war. What we did as a result of that follow-on, in collaboration with DOD, is we planned a national case finding study, looking, trying to identify 100 percent of cases of ALS in all Gulf war veterans, Gulf-era veterans, the 700,000 that were deployed, the 1.4 million that were not. We have just begun that process in March/April of this calendar year.

As we planned that study, we looked at some of the data very hard. And the preliminary result was that there was no increased rate of ALS among Gulf war veterans. But the preliminary observation was flawed, because only cases that were already known were looked at.

And the question is: Well, what if there are cases or patients with this that are not known? Then we could underestimate, and this initial preliminary result could be fallacious. The only way to get at that issue is to try to look at all of them.

The second issue, when we looked at this, is that Lou Gehrig's disease is typically a disease of older people. Even though Lou Gehrig himself died of this disease in his thirties, it is typically an older person's illness. And the age distribution in the cases that we had identified was younger than we expected. So we decided to go forward and try to answer this question definitively.

We engaged the help of the ALS Association of America to help us announce that we were doing this. We published a trial in multiple VSO and other magazines. We contacted the American Academy of Neurology, et cetera. The complicating factor in this is that the Congress passed legislation that awarded veterans benefits for having an undiagnosed illness. And the risk is—let us say that you are getting benefits because you have an undiagnosed illness. And I now examine you, and I figure out that you have ALS.

Senator HUTCHISON. Yes. Are you going to get around to telling me if you are going to give protection——

Dr. FEUSSNER. Yes.

Senator HUTCHISON [continuing]. To these people——

Dr. FEUSSNER. No.

Senator HUTCHISON [continuing]. Or is it something we need to do?

Dr. FEUSSNER. Yes.

Senator HUTCHISON. Are you telling me Congress needs to say——

Dr. FEUSSNER. Yes.

Senator HUTCHISON [continuing]. Veterans benefits will not be denied to people who have Lou Gehrig's disease?

Dr. FEUSSNER. OK.

Senator HUTCHISON. Or should it be—look, I am open.

Dr. FEUSSNER. No. Let me——

Senator HUTCHISON. If we need to make it more general, particularly as it results to Desert Storm syndrome, because I really think that we have spent $130 million, and we are still not willing to declare there is a syndrome here. And if that is our fault, you tell me. Because I am willing to do a couple of things for accountability.

Senator Specter, I will ask for his help on this. And we will introduce some legislation. And I will talk to Senator Warner about it and Senator Stevens. And we will see what we can do, if we can get a declaration that there is a Gulf war syndrome. And now that we have determined that there is one, we are going to cover people's treatment and people who have it, and we are not going to deny the evidence that they were healthy when they went into the war. I mean, we do not even let people who are unhealthy go into a deployment. You know that, and I know that.

So if they came in healthy, and they have symptoms now, and we have all the evidence in the world that says it is not just stress related, tell me what I need to do. And then let us focus on the fact that we have a syndrome, and how can we now work for treatment of this and future illnesses.

Dr. FEUSSNER. The issue with the ALS is very frustrating, ma'am. We have tried to gain some relief from the fact that if you were made—if you were known to have a diagnosis of ALS and were previously awarded benefits for having an undiagnosed illness, you would not lose those benefits.

We have actually met with and briefed Congress on this matter. We have informally in those briefings asked for legislative relief in that area. The legal folk at VA say there is no way to give or to retain benefits when the undiagnosed illness becomes diagnosed.

Now——

Senator HUTCHISON. Yes. But if——

Dr. FEUSSNER [continuing]. Ma'am——

Senator HUTCHISON [continuing]. We say there is a Desert Storm syndrome, which we have never in all of the papers that have been written, we keep saying there is really not one, we are trying to keep looking, and everything is different, and we cannot put it altogether, if we say there is a Desert Storm syndrome, does that not solve it? It may not be that all the symptoms are the same.

But then we can go about determining if there is a difference between sarin gas or the vaccinations or the different potential causes, if we just admit that one in seven people who went over there healthy and who came back with syndromes are not psychosomatic.

Can we not just say, OK, we now have a syndrome? Do not we solve that problem? And can we not get on with it? And maybe Lou Gehrig's disease is one of the results, but there are others as well?

Dr. FEUSSNER. Well, if I could finish the Lou Gehrig disease story. Because we were unable to resolve that issue, because of that benefits conundrum, and because we are required by the common rule to disclose benefits and potential risks of research to people who volunteer to participate in these trials, we thought it would be very important to make it explicit in the informed consent document that this was an non-resolved issue and that there was a risk to the veteran that their benefits issue might be complicated by that.

Now—so we are disclosing that information fully to veterans. To date, we have had four veterans who have refused participation in the trial because they were informed that this was a potential risk. We are able to count those. It would be best to have relief from this conundrum so that we could study all of them. But we are counting the ones who refused to participate because of this risk. And we will presume that they have ALS. And so if we err in the estimation, we err on the high side.

The problem with declaring that there is a Gulf war syndrome is, to follow up what Dr. Barrett said, that the research suggests that there is not. And the Senate investigation unit——

Senator SPECTER. Well, the research does not quite suggest that. The research is inconclusive. That is a lot different from the research suggesting that it is not.

Senator HUTCHISON. And we are saying long term as opposed to short term.

Dr. FEUSSNER. I would agree with you, sir.

Senator HUTCHISON. And long term, we have had 9 years. That is not long term yet. I do not think that you can say in any way, even from the stuff that you put out, which seems to be, all of you, to go in that direction, that there really is not one. But in fact, there are beginnings of nuggets that say there is. And we are not into long term yet, but we have a whole lot of evidence that says short term, yes; let us keep looking.

Do you not think that—I mean, have we not learned from the mistakes of the past? I mean, even agent orange. Why can the Department of Defense not get into the forefront of these issues? Why cannot the VA do its job of protecting its veterans? And I am not singling you out.

But I am just saying, why are we consulting lawyers instead of focusing our money on what our responsibilities are to our veterans, the clear common sense evidence that is before us, and saying, you know, we are not a bunch of lawyers, we are a bunch of doctors who are required to protect the people that are serving our country and the veterans and the retirees?

It just seems to me that we are getting awfully hung up trying to say that one in seven people are psychosomatic when we could do a whole lot better.

Senator SPECTER. Senator Hutchison——

Senator HUTCHISON. I appreciate the time.

Senator SPECTER. Senator Hutchison, I was about to compliment you for your comments. And I would associate myself with your remarks. I do not know what long term is, if 9 years is not long term.

And Dr. Feussner, I do not want to place too much emphasis on your comment, but I think it may indicate a predisposition when you testify that Gulf war syndrome was not caused by the exposure. All of the evidence turns out to be, we are told, scientifically inconclusive. And it is sometimes a little hard to understand what is sufficient to be conclusive scientifically.

And that is why, when Senator Rockefeller and I finished this 300 page report, which had been done—he was ranking at Veterans, and I chair—that we concluded that there was a causal connection between exposure to these toxic substances and Gulf war syndrome.

And Senator Hutchison puts her finger right on the spot when she talks about agent orange. That was the cause celebre when I came to the Senate after the 1980 election. And finally the Congress took the bull by the horns and established a presumption. And we deal on the Veterans Affairs Committee with some regularity about legislating presumption. If the doctors cannot come to conclusions, Congress can legislation presumptions.

But I think Senator Hutchison puts her finger on the point. And that is that the pragmatic conclusion is there is a connection. But as long as the veterans are being treated, that is the most important part. And I think there is an institutional reluctance by DOD and VA and other governmental agencies to make concessions which are likely to cost any money. That is what it comes down to again and again and again. And then the Congress has to make a judgment as to what we think fairness and equity is based on all the evidence which we have seen.

Senator Hutchison, you had a lot of good questions, and you had some time. But if you need more, you are welcome to it.

Senator HUTCHISON. No, Mr. Chairman. I would like to go on to the second panel.

I appreciate that you came. I would ask you, if you would just consider that you are the trustees. It is like—Senator Specter and I are lawyers, and we know that a trustee has a higher duty than just an average person. And I think you are the trustees for our military personnel. You are the trustees for our veterans. One in seven are suffering. And I just do not think we have come to the definitive answer that we should, as trustees for them.

So I would just thank you, Mr. Chairman. You have been very kind to let me go forward. I do have about five other questions, which I am going to abstain from asking. But I do think there is a general view here that is not the right one. And I would rather you come to Congress and say: We do want to declare this a syndrome. There is just too much evidence. We want to go for it. And it is going to cost money. Now we are putting it in your lap. You provide us the money. We are going to do the research. We are going to target it. We are going to declare that these people deserve treatment and compensation.

And let us make that decision. Because I will guarantee you, we will give you the money, if you will declare this a syndrome. And let us get to the bottom of it.

Thank you very much.

Senator SPECTER. Thank you very much, Senator Hutchison.

Thank you very much, Dr. Barrett, Dr. Rostker, Dr. Feussner, Dr. Claypool, Dr. Brown.

STATEMENT OF HAROLD C. SOX, JR., M.D., PROFESSOR AND CHAIR, DEPARTMENT OF MEDICINE, DARTMOUTH-HITCHCOCK MEDICAL CENTER

ACCOMPANIED BY DR. SAMUEL POTOLIKIO, PROFESSOR OF NEUROLOGY, GEORGE WASHINGTON UNIVERSITY

Senator SPECTER. We now turn to our second panel. Dr. Harold Sox, since 1998, has served as professor and chairman of the Department of Medicine at the Dartmouth Medical School. He currently chairs the Institute of Medicine Committee on Health Effects

Associated with Experiences in the Gulf war. He served 15 years as a professor at the Stanford University School of Medicine earlier in his career.

Dr. Sox, welcome to the hearing room. And we look forward to your testimony.

Dr. SOX. Thank you, Mr. Chairman and members of the committee. I am accompanied by Dr. Samuel Potolikio, who is a member of our committee, a neurologist, a professor of neurology at George Washington University. And I may turn to him for help with some of the questions related to several of the exposures that we studied.

The genesis of our report was a request from the Department of Veterans Affairs asking the Institute of Medicine to study the available scientific evidence on potentially harmful effects to which Gulf war veterans may have been exposed. Congress subsequently mandated a similar study, assessifying 33 specific agents.

Our committee was charged with assessing the scientific literature about potential health effects of chemical and biological agents present in the Gulf war theater. We expected the Department of Veterans Affairs will use our findings as a scientific basis for developing a compensation program for Gulf war veterans.

Our committee was not asked by Senator Byrd's and your enabling legislation to examine whether a unique Gulf war syndrome exists. We did, however, read the scientific literature on Gulf war illnesses. And we were aware of the symptoms of these illnesses as we read the literature for health effects of the agents that we studied.

In the first study of the series, the Institute of Medicine chose to study the agents that were of most concern to the veterans: sarin, pyridostigmine bromide, otherwise known as PB, depleted uranium, and the vaccines to prevent anthrax and botulism.

Because there have been very few published studies on Gulf war veterans, most of the studies that we examined were about exposures in occupational, clinical, and healthy volunteer settings. Let us begin with the nerve agent sarin. High doses of sarin can cause overstimulation of nerves and muscles within seconds or hours, creating symptoms such as severe cramping, difficulty breathing, twitching, and heavy sweating. All these short-term effects are well-documented. And we ranked this evidence as sufficient to establish causality, the highest level of evidence.

The long-term effects of sarin, however, are an entirely different story. The evidence is more limited in quantity and much weaker. Studies describing three different populations exposed to sarin, two involving victims of terrorist attacks in Japan and one involving industrial accidents in the United States, establish possible links to neurological and psychological symptoms that persisted for 6 months or longer.

In all three studies, however, the patients all had an immediate, intense, widespread acute reaction, typical of the high levels of exposure to sarin. Among the symptoms that persisted over the long run in these patients were fatigue, headaches, blurred vision, and symptoms of post-traumatic stress disorder. But it is important to remember that people who had these long-term symptoms all experienced intense symptoms immediately. Because we are dealing

with the study of only three populations and because we could not rule out alternate explanations for the effects, the committee categorized these findings as limited or suggestive of an association between acute exposure to sarin in high doses and long-term effects.

Few, if any, veterans actually reported symptoms of acute exposure to sarin. Therefore, we concerned ourselves with possible effects of sarin in doses too small to cause the acute reaction. And based on the available evidence, we could not form a conclusion about an association between long-term health effects and exposure to sarin that are low enough so there were no immediate signs or symptoms. Yet research with non-human primates gives us a hint that long doses of sarin over long periods might create delayed neurological reactions, a finding that clearly needs substantiation with further research.

The second agent that we studied was PB, pyridostigmine bromide. There have been many effects of the short-term uses of PB. And the committee judged this evidence to be sufficiently strong to demonstrate an association between exposure and the immediate onset of mild, transient symptoms, a length that has been seen consistently in many studies. Long-term effects of PB are an entirely different story. There simply was not enough evidence to draw any conclusion about PB's long-term effects. In other words, we do not know if they occur, and we cannot be certain that they do not occur. The author of one series of studies has suggested that PB alone or in combination with other chemicals could be related to some chronic changes in nerve function reported by Gulf war veterans. However, weaknesses in the design of these studies made it impossible for us to decide if exposure to PB is associated with long-term nerve damage. And we recommend further investigation with an improved design.

The third agent was depleted uranium. Health effects of natural uranium have been widely investigated, mostly in occupational settings. While these studies have shown that uranium has either no effect or a very small effect, our committee found weaknesses in many of these studies. And we could not draw conclusions about exposure to uranium and death from a number of diseases, including lymphatic or bone cancer.

We were able, however, to arrive at more certain conclusions regarding kidney disease and lung cancer. Based on the study of the Baltimore cohort of veterans, we concluded that there is limited evidence of no association between kidney disease and exposure to uranium. And we based this study on several consistent studies that showed good kidney function despite continuous exposure to uranium as it dissolve from uranium fragments imbedded in body tissues.

Similarly, at low levels of exposure to uranium, we found limited evidence of no effect, or no association, with death from lung cancer. At higher levels of exposure, the evidence did not permit any conclusion.

Finally—and I will be wrapping up shortly—our committee considered the vaccines given to prevent anthrax and botulism. Based on our review of the scientific literature, we concluded that the evidence is sufficient to demonstrate an association between these

vaccines and subsequent long-term—short-term, correction—local and systemic effects similar to those associated with any vaccination, such as the ones that people in the audience have received.

When we sought evidence for more lasting effects, we did not find any published peer review studies that systematically followed subjects over the long term, a situation that is not unusual as vaccines are seldom monitored for adverse effects over long periods of time.

Some have questioned whether several vaccines in combination could result in health effects that would not be seen with a single vaccine alone. Although we did find some evidence, research, on cumulative effects of combinations of vaccines, the shortcomings of these studies made it impossible for us to draw a strong conclusion.

PREPARED STATEMENT

The IOM is beginning the second phase of this study, in which it will examine the literature on the health effects of pesticides and solvents. Plans for future IOM studies include completion of studies of the remaining agents from those listed in enabling legislation. The IOM will also update its prior studies as new studies enter the published literature.

Thank you for your attention.

Senator SPECTER. Thank you very much, Dr. Sox. And thank you for your work with the Institute of Medicine.

[The statement follows:]

PREPARED STATEMENT OF HAROLD C. SOX, JR.

Good morning, Mr. Chairman and members of the committee. My name is Harold Sox. I am a professor and chair of the Department of Medicine at Dartmouth-Hitchcock Medical Center in Lebanon, New Hampshire. I chaired the Institute of Medicine Committee on Health Effects Associated with Exposures During the Gulf War, which released its report on Thursday, September 7. I appreciate the opportunity to provide testimony to you today based on the findings of this report. I am accompanied by Dr. Samuel Potolicchio, a member of the IOM committee and Professor in the Department of Neurology at George Washington University Medical Center.

The genesis of the report was a request from the Department of Veterans Affairs, asking the Institute of Medicine to study the available scientific evidence on potentially harmful agents to which Gulf War veterans may have been exposed. Congress subsequently mandated a similar study listing 33 specific agents for study. Thousands of Gulf War veterans have experienced chronic, unexplained health problems, and are asking whether these agents might be responsible.

It is important to clarify the scope of the committee's work. The committee was charged with assessing the scientific literature regarding potential health effects of chemical and biological agents present in the Gulf War. The findings of the report will be used by the Department of Veterans Affairs as a scientific basis for developing a compensation program for Gulf War veterans. The committee was not asked to examine whether a unique Gulf War syndrome exists or to review or evaluate the literature on Gulf War syndrome or illnesses. Additionally, it was not asked to make judgments regarding the veterans' levels of exposure to the putative agents as there is an assumption of exposure for Gulf War veterans. For the first study of the series, the Institute of Medicine chose to study the agents of most concern to the veterans: sarin, pyridostigmine bromide (PB), depleted uranium, and the vaccines to prevent anthrax and botulism.

Because of the limited studies in Gulf War veterans, most of the studies that we examined involved exposures in occupational, clinical, and healthy-volunteer settings. We carefully assessed each study's quality, limitations, and applicability.

When it comes to the long-term health effects of these substances, the bottom line is we simply don't know enough to say whether there is a connection between exposure to these agents or combinations of agents and specific health outcomes that remain long after the exposure. At most, we found some very limited evidence that might suggest a possible connection with the nerve agent sarin. These effects, if

they truly exist, occur in individuals whose dose was large enough to cause acute symptoms immediately after the exposure. It will take further research to explore this relationship.

Let's begin with the nerve agent sarin. It is so potent that as little as 100 milligrams—about two drops—can cause convulsions and death. As a gas, roughly 50 milligrams can be fatal. Lower doses can cause overstimulation of nerves and muscles within seconds or hours, creating symptoms such as severe cramping, difficulty breathing, twitching, and heavy sweating. In the more severe cases, these symptoms are widespread and affect many parts of the body.

All of these short-term effects are well-documented, and we ranked the evidence as sufficient to establish causality, the highest level of evidence. In part, this means many studies have strongly, repeatedly, and consistently linked these acute health effects and exposure to sarin, and that the greater the exposure, the greater the effect. But the long-term effects of sarin are a very different story. The evidence is far more limited and much weaker. Studies describing three different populations—two involving victims of terrorist attacks in Japan and one involving industrial accidents in the United States—linked neurological and psychological symptoms that persisted for six months or longer. In one of these studies, some symptoms persisted for up to three years, the longest that any of the subjects were followed. In all three study populations however, the doses of sarin were high enough to trigger an immediate, intense, widespread, and acute reaction. Among the conditions that persisted over the long term were fatigue, headaches, blurred vision, and symptoms of posttraumatic stress disorder. In other words, people who had long-term symptoms were the ones who had experienced intense symptoms immediately.

Because we are dealing with studies of only three populations here, and because we could not rule out other explanations for the effects, the committee categorized these findings as limited or suggestive of an association—well shy of the evidence needed to establish a possible link, but warranting further investigation. In this case, we recommend research to track the health of the victims of sarin attacks in Japan, since they provide the best opportunity for conducting controlled studies.

Based on available research, we could not form a conclusion about an association between long-term health effects and exposure to lower doses of sarin—low enough so that there were no immediate signs or symptoms. Yet, research with nonhuman primates gives a hint that low doses of sarin over long periods may create delayed, neurological reactions. More research is needed to substantiate this finding. We recommend that such studies be pursued.

The second agent we considered was the drug pyridostigmine bromide. It is routinely used to treat patients with myasthenia gravis, a disease that causes weakening of the muscles. PB does have side effects. It is known to cause mild, tolerable, and transient gastrointestinal and muscular symptoms. In the Gulf War, troops were given packets of PB tablets to take in advance of a chemical weapons attack in order to blunt the effects of nerve agents. The recommended doses were lower than those commonly used by doctors to treat patients with myasthenia gravis.

There have been many studies of the short-term effects of PB, and the committee judged this evidence to be sufficiently strong to demonstrate an association between exposure and the immediate onset of mild, transient symptoms. Many studies have repeatedly and consistently supported this linkage. Long-term side effects of PB are another story. There simply was not enough evidence to draw any conclusion about PB's long-term effects. In other words, we don't know if they occur, and we can't be certain that they don't occur. One series of studies has suggested that PB, either alone or in combination with other chemicals, may be related to some chronic changes in nerve function reported by Gulf War veterans. However, weaknesses in the design of these studies, which include uncertainties about exposures and a small sample, made it impossible for us to decide if exposure to PB is associated with long-term nerve damage. We recommend further investigation using an improved design.

The third agent that we considered was depleted uranium. During the Gulf War, some tanks and munitions containing depleted uranium caught fire or exploded. As a result, a number of soldiers are likely to have inhaled or ingested uranium dust, although the intensity of the exposure is unknown. Flying fragments containing depleted uranium injured others, leaving fragments embedded in tissue.

In its depleted form, uranium is 40 percent less radioactive than in its natural state. Health effects of natural uranium have been widely investigated, mostly in occupational settings. While these studies have either shown no effect or a small effect as a result of uranium exposure, our committee found weaknesses in many of these studies. We could not draw conclusions about exposure to uranium and death from a number of diseases, including lymphatic or bone cancer, nonmalignant respiratory illness, and diseases of the liver and gastrointestinal tract.

But we were able to arrive at more certain conclusions regarding kidney disease and lung cancer. We concluded that there is limited evidence of no association between kidney disease and exposure to uranium. We based this conclusion on several adequate, consistent studies that showed good kidney function despite continuous exposure to uranium as it dissolved from uranium fragments embedded in body tissues. Similarly, at low levels of exposure, we found limited evidence of no association with death from lung cancer. At higher levels of exposure, though, the evidence did not permit any conclusion about the relationship to lung cancer. We recommend follow-up research on veterans with embedded fragments of depleted uranium and other long-term studies.

Finally, our committee considered the vaccines given to prevent anthrax and botulism. More than 150,000 U.S. troops received injections of these vaccines to protect them in the event of biological warfare. Based on our review of the scientific literature, we concluded that the evidence is sufficient to demonstrate an association between these vaccines and subsequent short-term local and systemic effects. The symptoms include redness and swelling at the site of injection, similar to those associated with any vaccination. But when it came to evaluating more lasting effects, we didn't find any published, peer-reviewed studies that systematically followed subjects over the long term. This situation is not unusual, as few vaccines have been monitored for adverse effects over long periods of time.

Since troops usually received several vaccines, often within a short span of time, some have questioned whether several vaccines in combination may have created a cumulative effect when any single injection did not cause a reaction. Although we did find some research on cumulative effects of vaccines, the shortcomings in these studies made it impossible for us to form a strong conclusion. We did decide that this evidence was inadequate to determine whether an association exists.

This is a brief overview of the report's findings. The IOM is beginning the second phase of this study, and it will examine the literature on the health effects of pesticides and solvents. This study will be completed in 2002 as there is a large body of literature on these compounds. Plans for future IOM studies include completion of the remaining agents from those listed in the legislation. Additionally, the IOM will conduct updates of the literature as new studies become available.

Thank you for your attention. My colleagues and I will be happy to answer your questions.

STATEMENT OF ROBERT W. HALEY, M.D., PROFESSOR OF EPIDEMIOLOGY, UNIVERSITY OF TEXAS SOUTHWESTERN MEDICAL CENTER

Senator SPECTER. We now turn to Dr. Robert Haley, professor of internal medicine and chief of epidemiology at the Department of Internal Medicine at the University of Texas Southwestern Medical Center in Dallas. Prior to this position, Dr. Haley served for 10 years as an epidemiologist and division director for the Centers for Disease Control and Prevention in Atlanta, Georgia.

Welcome, Dr. Haley, and we look forward to your testimony.

Dr. HALEY. Thank you very much, Senator. Let me get organized here a second.

Well, as you know, we began studies back in 1994 with the funding assistance and encouragement of Ross Perot, who is going to talk later on this program. As you also know, I spent 10 years at the CDC involved in investigating epidemics and employing the technique that Senator Hutchison referred to a little bit ago. And I think that is the way that we should have been proceeding all along to try to solve this.

We need to go to small groups, a number of studies going to relatively small groups, so that you can do the types of detailed studies that can actually show the cause of this illness. This was the lesson we learned in toxic shock syndrome, Legionnaire's disease, AIDS, all of the major mysteries that have been solved. And this technique has been underutilized in this problem.

We took a group of Seabees, a battalion, went into them, applied a case definition, separated them into those that met our definition of a syndrome and those, the normals, who did not meet the syndromes. And now we have done a series of studies funded by the Perot Foundation and then a second series funded by the Joint Chiefs and the Secretary of Defense Officer, where we have tried to ask the question: How do we solve what the problem—how do we decide what the disease is?

The problem with the studies like the Iowa study, the British studies, they are doing a lot of exams in the CCEP. They are doing a lot of examinations, but they are using the wrong test. They are using superficial physical examinations, x rays, you know, the usual brain MRIs that do not show anything. And so predictably, those studies are going to show that there is no physical problem to these veterans.

What we have done is gone in the other direction. We have used the might of our research institution, four Nobel laureates on our faculty—it is a very austere group of people—who can measure all types of brain abnormalities. And we have asked, what tests now could we use that might show a physical basis for this injury or illness.

So let me just quickly show you up here—Mark, why do you not bring those over here? And I will just show the Senator, and the audience can look later.

But basically, this was our original study from the Seabees unit. This is—Dr. Drue Barrett from CDC mentioned how people are using factor analysis. It is a way of determining, is there a syndrome present in these veterans. In other words, Senator Hutchison, you wanted to know: Is there a syndrome?

Well, what you do is you measure the symptoms of veterans, and then you apply this mathematical technique. And this scale here shows you the strength of clustering into syndromes. And what you see here is three very strong syndromes in this group of veterans that we studied. Now this is a very unusual finding. You do not find this often.

Now the key to our study was, however, we studied a whole bunch of other veterans before this and came up with what we thought the syndromes were and asked the very symptoms that would show this. That was the symptoms of the Gulf war syndrome. The Iowa study and the British study asked about psychiatric symptoms, about psychiatric diseases that we know are common in any population. And so their syndromes are going to be psychiatric. We asked syndromes that we thought were the Gulf war syndrome. And sure enough, there they are, three very strong syndromes.

Senator HUTCHISON. Are you going to tell us what they are?

Dr. HALEY. Well, yes, very briefly. It is really not very material, except I will just give you a quick—we call them syndromes one, two and three. Syndromes one and three are fairly mild. These guys are still working. They have cognitive problems, a lot of body pain, depression, sleep problems, and so forth.

Syndrome two is the bad one, though. These guys are the ones who are not working, who are really incapacitated. These people have dizziness problems. And I think one of the veterans that you

are going to talk to later was one that we modeled this after, actually, when we discovered that dizziness is a real big problem in this particular group.

We recently talked to people in some VA hospitals around the country, and they said, "Well, we don't see any of this dizziness." And I said, "Well, they don't bring it up. It's subtle. You need to ask about it."

And as soon as they did, gee whiz, they found a bunch of these. And now they have done some brain scans that I am going to show you in a minute, and they have found the same thing in another place.

OK. Now let me go to the next one, because I know we do not have much time.

The second question about those syndromes is what might have caused them, and are they different, and is there a connection to some cause in the war. We did a lot of epidemiologic studies with self-reported risk factors, as you have talked about already. And we had evidence that certain chemicals were highly associated with being in one of these syndrome groups, compared to the controls. But we have now a piece of evidence that is even more important.

This is a study of a gene called the PON gene. PON stands for paraoxonase, but that is immaterial. And there is a variety, a special variety, of this called the PONQ variety of this enzyme. Now this enzyme is in everybody's blood. And the purpose of this enzyme—I do not know why God put it there, but it protects you from nerve gas. And that is about its only function in the toxicological realm. Now it is also important in protecting you from heart attacks and so forth, but that is irrelevant.

The point is, it has a very specific effect in detoxifying low levels of nerve gas, when it gets in your blood. So we reasoned, OK, if nerve gas is the cause, you would expect the sick people to have been born with low levels of that, not to have any protection, and the well guys would have had high levels of that. So when whatever low level sarin came over, the people with high blood levels would be protected. And the ones that were born without much of that, it would get through their blood and into their brain, and they would get sick.

Well, in fact, that is exactly what we found. Here are the controls in the first column. You see the controls. And their blood levels are up between 75 and 150, as you see. And that is the normal range in most general population. Look at syndrome two. Remember? Those are the ones I said had the most brain damage, the most severe problem. And look. Their levels are extremely low with three exceptions. And, of course, in biology, nothing is ever perfect.

But the point is, this has shifted way down. This suggests these people were born with low levels of protection against nerve gas.

Now remember, this enzyme does not protect you against anything else. So the question—so this is very provocative, Let me say provocative, evidence. This study is too small yet to reach a final conclusion, but it is very provocative evidence that not only shows why some guys got sick and others did not, it also connects it to nerve gas, because this enzyme does not do anything else in terms of chemicals.

OK. The next finding. Now the next real issue—Mark, hold those, and let me hold this up—OK, is this brain damage? Now everybody says, well, this is just a syndrome. It is just symptoms. Symptoms are increased in one group over another. Well, no, it is not. We think there is a brain cause for this.

Now, in order to look at this, we first did a lot of exams, a lot of physical exams, by neurologists in X-rays and lab work and compared the sick people and the well people. All right? None of that was any different. You see, that is what the Iowa study is going to show. It is going to show there is no difference, because they are only doing those things.

We then said, well, let us go one step further. Let us do brain MRIs, brain scans of the head. Well, we did those. And here is a typical brain scan. And those were all normal, all the same in both groups, no difference. So there is no tumor or stroke or multiple sclerosis or anything like that, Alzheimer's, or anything that would explain the difference in symptoms.

So then we went to one further level. There is a new kind of scanner called magnetic resonance spectroscopy, or MRS for shot. Instead of MRI, this new one is MRS. All right? Now what you do there, you have to focus on one part of the brain. And what I am showing you, here is the big part of the brain here. And this is the little brain stem down here that connects down to your spinal cord. All right? We focused on where this little box shows right here. We focused the MR machine on that little box. And with this new MRS technique, you can measure the chemical concentrations of all the chemicals that are right here. This is MRS.

This is a printout that shows you what the chemicals are in typical brain tissue. And there are three main chemicals. And I will focus on this one. See this big spike here? This is called NAA. It means N-acetyl aspartate. But it is one of the main chemicals in your brain, and it is found only in nerve cells, neurons, nerve cells, and the connections between nerve cells, the hardware in your brain.

Now, this chemical is really interesting. It is like a barometer of health of the neuron, of the brain cell. And anything that damages that neuron and makes it unable to function causes this chemical to go down. It drains out. Now nobody knows why or whatever, but the point is, it is a very sensitive and well-documented—there are at least 300 papers written in scientific literature showing this is a good measure. They have used it in multiple sclerosis, in Alzheimer's, and 100 different brain diseases to show that this is a measure of the health of those brain cells. And anything that damages brain cells causes this to go down.

So we then compared a group of normal veterans and a group of sick veterans with our Gulf war syndrome two, you know, the one that is really bad. Well, these guys are really sick, where they had the genetic predisposition that suggests they were exposed to sarin nerve gas and had brain damage as a result. Look what we see. In the group of controls, we have a normal level of this chemical, meaning their brain cells are normal in this part of the brain now. Whereas in the sick veterans with syndrome two, look at that. Look at the difference.

The level of NAA is substantially reduced from 10 to 25 percent.

Senator HUTCHISON. And that is the only thing that is different.

Dr. HALEY. That is the only thing that is different.

Senator SPECTER. Dr. Haley, how much longer do you expect to be?

Dr. HALEY. About 2 minutes.

OK. This is very strong evidence, at least in this small group of people, that there is a brain injury, and it is in the brain stem and the surrounding areas, called the basal ganglia, these deep brain structures. It turns out, when you look at the literature on diseases that affect these structures, the symptoms are Gulf war syndrome. It is exactly the kinds of symptoms you would expect.

Now one final finding. We just published this in the last 2 weeks. So not many people know about this yet. This was in the Archives of Neurology 2 weeks ago.

We now looked at this measure of brain cell injury down here, the same one I just showed you. So in other words, up here they are normal, normal brains are up in here. And the ones with brain injury are down here. OK? We measured here the amount of dopamine, the brain neurotransmitter that these people's brains are producing.

And there is a blood test, a way you can test in the blood for the breakdown products. But the idea is, how much dopamine is their brain producing?

You remember just 2 days ago, the Nobel prize for this year was awarded to the people who discovered the idea of dopamine. It is one of the key neurotransmitters of the brain.

We found that the more brain damage you had, the more evidence of abnormal neurons in the basal ganglia—that is, these deep brain structures—the higher your brain dopamine production goes. In other words, if the brain dopamine production is going out of control, this is exactly what you find when you experimentally injure these deep brain structures in, say, rats or other experimental animals. What happens, the first thing that happens, is dopamine goes out of control. And then over many, many, many years these cells, being overworked, they wear themselves out, and then you get low dopamine, and you may get things such as Parkinson's disease or other diseases that relate to this area of the brain.

Now the probability, even though this was a fairly small sample, the probability that this result occurred by chance because the sample is too small is this, 1 in 100,000. This is a very, very strong finding. Now again, this is a small sample, and, you know, we have to replicate it.

Now, in final let me just say, we took a very unique and new approach. It is really based on the old CDC technique, cases versus controls. And then you do the tests that are necessary to show what the disease is. Remember in Legionnaire's it took them a year to find all the different tests and to find the one that really paid off. Well, we think we have done that.

Now the next step is, we have proposed a large grant proposal to replicate this, to take a random sample of those who served in the Gulf war and a random sample of those who did not, do, Senator Specter, a telephone survey, as you were talking about a minute ago, a telephone survey to determine how many have these

syndromes and how many do not, and then bring in small random samples of those and try to replicate this.

PREPARED STATEMENT

In other words, this is not a definitive finding yet, but it is a major lead that needs to be followed up. We proposed a grant of $25 million, because the survey is expensive. We then want to follow these people up and do much more intense brain chemistry. We also want to do animal studies in comparison to study them in parallel. This is very expensive research over several years. That proposal is at Fort Detrick now. We actually submitted it as an unsolicited contract proposal, and we hope that we will get support.

Thank you.

Senator SPECTER. Thank you very much, Dr. Haley.

[The statement follows:]

PREPARED STATEMENT OF ROBERT W. HALEY

Senators—I want to thank you for the opportunity to speak to you about the research on the nature and causes of Gulf War syndrome, conducted and coordinated by my group at the University of Texas Southwestern Medical Center in Dallas. Our research began in 1994 under initial funding support from the Perot Foundation of Dallas and has been continued under a 1997 cooperative agreement with the Office of the Secretary of Defense administered through Ft. Detrick, which expired two weeks ago. In July we submitted a proposal for funding a new phase of our research.

INITIAL FINDINGS

Our initial studies focused on 249 members of a Reserve Naval Mobile Construction Battalion, or Seabees. In that work, we made four important observations. First, we found that there is a single Gulf War illness with three variants. Second, those with the illness have more abnormal brain function by objective tests than well veterans, suggesting a brain injury or illness. Third, the sick veterans were 4 to 32 times more likely to report exposure to combinations of certain chemicals in the war, specifically sarin nerve gas, side effects from pyridostigmine, highly concentrated government-issue DEET insect repellant, and pesticides in flea collars. And fourth, in collaboration with researchers at Duke and Kansas State universities and the EPA, we experimentally produced brain and nerve damage in hens with combinations of some of these same chemicals, not previously thought to be neurotoxic. In January 1997 this work passed rigorous peer review and was published in three scientific papers, appearing back to back in the Journal of the American Medical Association. A research group in India led by K. Husain, has extended these findings by demonstrating neurological damage from low-level sarin nerve agent in two animal species.

MOST RECENT FINDINGS

Later in 1997 we submitted a $16 million proposal to extend and replicate our initial findings in a national survey, but it was not funded by the government peer review system administered by the Persian Gulf Veterans Coordinating Board. Later the Joint Chiefs and the Secretary of Defense conducted a special peer review of the proposal and granted us partial funding of $3 million through a cooperative agreement to begin further testing and plan a national random-sample survey to replicate our findings.

With that funding, we have made four additional important observations. First, we identified a gene, the PON1 gene, that appears to have predisposed soldiers to getting the Gulf War syndrome and appears to link the illness with low-level sarin nerve gas exposure. Second, we demonstrated the site of brain damage with a new brain scanning test called Magnetic Resonance Spectroscopy (MRS). Third, we found abnormal increases in the brain hormone dopamine in those veterans with the worst brain damage measured by the MRS scans. (The original brain dopamine research was awarded the Nobel Prize earlier this week.) These findings were all published in top medical journals after passing rigorous peer review. Our fourth finding has been to develop an animal model of the Gulf War syndrome, that is, long-term be-

havioral disturbances from administration of low, sub-symptomatic doses of the chemicals to which Gulf War veterans were exposed. This has not yet been published.

Along the way, I published important commentaries in peer-reviewed journals showing that the government studies pointing to stress as the cause of Gulf War syndrome were based on statistical errors that invalidated them.

LIMITATIONS OF THE RESEARCH

To put our research findings into proper perspective, it is important to realize that we have framed a theory or hypothesis which could explain the nature and causes of the Gulf War syndrome, but this theory is not thoroughly proven. Since our studies were the first to blaze this trail, they were relatively small and focused in a single battalion and therefore might not be representative of what is true in the larger Gulf War veterans population. On the other hand, the CDC studies that have solved hundreds of epidemic mystery diseases in the past have traditionally been very similar to our studies on Gulf War syndrome. Epidemic diseases have unique characteristics that make these studies useful.

Consequently, our theory is in need of extension by us and replication by other researchers working independently but using the same methods as we have used in deriving the theory. At present we have replicated parts of our work in a new group of Gulf War veterans recruited through the Dallas VA Medical Center, and an independent researcher in another state has replicated our MRS brain scanning finding in a small group of sick and well Gulf War veterans. Several other studies have questioned our theory, but none has actually tested our findings using the same methods. Scientifically, a replication requires use of the same methods.

CURRENT RESEARCH PROPOSAL

Last summer my research team submitted a new proposal to extend and replicate our work. We asked for $25 million over two years to establish an independent Gulf War Illness Research Center to do the studies necessary to advance the findings substantially. Briefly, we proposed to:

1. Perform a national survey in random samples of Gulf War-era deployed and non-deployed veterans to compare the prevalence of the illness we have identified. DOD has already invested $500,000 in planning this survey, and it is virtually ready to go. An independent survey firm will carry out the survey to ensure objectivity.
2. Upgrade to the latest brain imaging technology to explore deeper into the nature of the brain damage and attempt to develop a cost-effective diagnostic test that could be widely applied to make objective diagnoses.
3. Extend our new laboratory animal model of Gulf War syndrome by testing for chronic behavioral effects of low-level sarin alone and in combination with pesticides and pyridostigmine.
4. Re-study veterans from our prior studies to determine whether they are getting better or worse over time.
5. Identify and test promising treatments.

For this new work to be successful, it will be important to receive funding under a mechanism that will give us an appropriate degree of independence to follow our own instincts on research directions in a timely manner. In addition, we will need the cooperation of the Department of Defense in providing the computer list of Gulf War-era military personnel for us to draw our national random sample, assisting us in promoting the survey to maximize the participation rate, and providing exclusive chemical reagents for our laboratory experiments.

This research was submitted as an unsolicited contract proposal to Ft. Detrick's contracting department in July, and we are awaiting a reply.

STATEMENT OF HON. MAX CLELAND, U.S. SENATOR FROM GEORGIA

Senator SPECTER. We have been joined by our distinguished colleague from Georgia, Senator Max Cleland. Senator Cleland is here to make an introduction. And as our custom is, when a colleague enters the room, we defer to him. We do interrupt a witness, but we defer to our colleague as soon as there is a break in the action.

So we welcome you here, Senator Cleland. We understand you are going to introduce Mr. Ross Perot. We are not sure that Mr. Perot needs an introduction, but that is not the standard for introductions in the Senate.

But just a word or two about you, Max. You have an extraordinary record. It has been our pleasure to have you in the Senate since your election in 1996 and a very distinguished veteran. I was very impressed when at lunch one day you told me what life day was.

Life day is the day when you live, notwithstanding being victimized by a shrap line explosion where you suffered very severe injuries, as are apparent, and then went to become a State senator and Secretary of State and head of the Veterans Administration and now a U.S. Senator.

We are proud to serve with you, Senator Cleland, and the floor is yours.

Senator CLELAND. Thank you very much, Mr. Chairman. It is in my capacity as a former veteran and certainly as a former head of the Veterans Administration and my continuing interest in the lives and well-being of our veterans that I gladly appear today. It has been my pleasure to get to know Dr. Haley and his magnificent pioneering research. We have discussed this matter over the last 2 or 3 years. And it is a magnificent story, an investigative story, worthy of Sherlock Holmes at his best. And these deductions bring a profound insight, I think, into the question of the Gulf war syndrome.

But one of the men, if not the man, behind getting this research under way is the person I am about to introduce today. He is a man who is deeply dedicated to our country. He is deeply dedicated to our veterans and the families who suffer from war and from military service.

Ross Perot has a long history of coming to the aid of our country's servicemen and women. In 1972, he received the Medal for Distinguished Public Service for his 4-year project to improve treatment of our Vietnam prisoners of war. I can think of no citizen who has done more for our service men and women.

Almost 700,000 active duty service members and activated National Guard and Reserve members served in the Gulf theater of operations. And after hearing stories of soldiers who returned from the Persian Gulf war sick or disabled for unknown reasons, Ross Perot approached the University of Texas Southwestern Medical Center in Dallas to personally fund a U.S. Armed Forces veterans distinguished Chair for medical research.

Ross is the power and the driving force behind this research that Dr. Haley has brought to us. He is helping researchers to investigate Gulf war illnesses and search for ways to prevent and treat it. He has helped combine the private sector with researchers at the Departments of Defense and Veterans Affairs to enhance efforts to help those who served our country so heroically.

It is my honor to introduce a great patriot, a great American, and a man who is deeply committed to finding the answers to Gulf war syndrome, Mr. Ross Perot.

Senator HUTCHISON. Mr. Chairman, as Mr. Perot is coming forward, I would just like to say that I cannot think of anyone who could better take my prerogative away and introduce one of my constituents than Senator Cleland.

And I am proud that he did. Thank you.

STATEMENT OF ROSS PEROT, PRESIDENT, CEO AND CHAIRMAN, PEROT SYSTEMS CORP.

Senator SPECTER. Well, welcome, Mr. Perot. We know of your—go on.

Mr. PEROT. I have two things that I would like all of you to look at. I would like you to look at this picture of a young tiger going into combat in Desert Storm. That is a book. He is dying there. He is dying of Desert Storm syndrome. I would like you to look at him now, sitting in his wheelchair with his little children around him in the last few months he had. That is what this is all about.

Senator SPECTER. Well, thank you very much for the book and the magazine, Mr. Perot. And we——

Mr. PEROT. I just—you see a picture is worth a thousand words. And when you think of what——

Senator SPECTER. We are not going to charge any of that against your time. Subtract 2,000 words from your testimony.

Mr. PEROT. There is one other good example here today, the young man who works with Senator Cleland. Remember the story of the enlisted man whose legs got entangled in a mooring line on a ship? He was being dragged to a point where his legs had been literally torn off. And this ensign raced in to rescue him, freed him up, and then his leg got tied up, and he lost his leg.

This is Ensign Johnson. He must—he was here a minute ago. I hope he is here now. Now this is a man who did the right thing. And when you see Senator Cleland, I am sure if you ask him, if you say: Well, as soon as you were wounded, did someone come out and get you? He could tell you stories that would make you cry, in terms of risks that people took to rescue him.

That is what we are talking about here today, is rescuing people that have suffered for 9, 10 years, and defining what the injury is and clearing it up. I have had the privilege for many years for assisting military personnel and their families with health problems that could not be taken care of within the military health system. I got started in this when a group of seriously injured Desert Storm veterans contacted me in 1994 seeking medical assistance. They had been exposed to chemical agents and other toxic chemicals during the war.

These people had a wide range of serious health problems, including children that had been born with crippling deformities. Can you—I would much rather lose my leg than have a child born without one. And I know all of you would agree with that. That is a real price to pay for your country.

Logically, you would ask, where did Iraq get these chemical weapons. We gave them to them in the 1980s to use against Iran. That was a violation of the rules of warfare. We did it. That is history. In plain talk, we violated the first rule of war, and that is do not shoot yourself. That is maybe one of the reasons we, you know, juggle, tap dance, and chew gum instead of working on this problem.

Studies indicate that up to 100,000 people who fought in Desert Storm have these health problems, including brain damage from chemical agents, which we refer to as Gulf war syndrome. We must solve these problems for two reasons. One, to treat our wounded

soldiers and their families, and to protect our military forces and our entire population from these chemical agents in future wars.

Other nations have been working on how to protect their populations since the 1950s. Russia had all this work done in Czechoslovakia. The Russians brought people who were captured in the wars of Vietnam and Korea, our men, all the way in, and they were used as human guinea pigs to determine how you test your people against chemical weapons and nuclear radiation.

If you question that, there was a Dr. Jan, J-a-n, Sejna, S-e-j-n-a, who worked in the—he was a defector from Czechoslovakia, came out in about 1968. He worked in the Pentagon in the Defense Intelligence Agency. So he must have some credibility. I have heard him speak openly in meetings about the fact that our men were used as laboratory animals.

The interesting phenomena is—let us fast-forward to this war—guess who we used at the frontiers of technology to protect our people from chemical weapons, the Czechoslovakian group. They have written a book about it. I am having it translated into English now. And now you see all the pieces of the puzzle coming together. We did not prepare to protect our men, and we had to rely on the Russia technology done in Czechoslovakia to have that done during the war.

Modern technologies, including nuclear, chemical and bacteriological weapons can totally change the nature of future wars. We could have our entire population—this is how important this meeting is. We could have our entire population devastated in a nondeclared war waged in the United States, and we will not even be able to identify the enemy. I am sure you will recall the use of chemical agents in the Tokyo subway, as one little example.

You know we have nuclear weapons with the destructive power of the weapon we dropped on Hiroshima that you can put in a suitcase. Think creatively about how that could be used. We have no effective defense against these chemical weapons and no effective way to protect our troops against these chemical weapons. These are compelling reasons to move forward aggressively to find answers.

Our Government has spent $500 million trying to prove that these illnesses were created by stress. And they have failed. This conclusion is—now, look, you went over, you fought, you were wounded, you came home, you cannot do the things you used to do. And I have talked to so many of these people, it would break your heart when you talk to them. And you have some here today.

They served us. We have not served them. And then to have all of this just written off saying, well, he could not handle the stress. It makes no sense at all, when you look at the numbers from prior wars. Do not think for a minute that the military units in the Pentagon are doing this. The military units in the Pentagon care for these people. And if somebody in this audience is wondering how to get me to go away, if the Chairman of the Joint Chiefs and all the service chiefs called me and said: Perot, we do not want you do this, you are doing the wrong thing, our men have stress, they are not wounded in combat, I will stop.

Well, let us assume the stress theory has validity. Well, we should have had terrible stress in World War II. It was a really

long, hard, dirty war, fighting day after day, month after month after month. We have twice the incidents of stress using the definition that this group has come up with in the 100-hour almost non-war that we had in World War II. To me that indicates right away. Three times the incidence of stress that we had in Korea. We had battles in Korea.

You remember when the Marines were fighting the Chinese? There were so many of them, and some of them did not even have weapons. But there were just so many of them, they could not fire fast enough to keep from being overwhelmed. That is a stressful situation. And yet we have three times the stress in Desert Storm that we had there.

Now then, after Vietnam we did have a post-Vietnam stress syndrome. I think if we had ever done any real research on it, we would find that most of that came from rude treatment received by men when they came home. When you come home and get spat on on the streets, that is worse than getting shot at.

Now interestingly enough, we had no post-Vietnam stress syndrome from prisoners of war, who normally are treated as unlucky people when they come home. But in that war, they were treated as heroes. Our men coming home from the short war in Desert Storm were treated as heroes. There were parades all over the place. They got the warm welcome home, but they had been poisoned by chemical agents. And we have an obligation to treat them.

This is agent orange revisited. I lost several friends to agent orange. So I have spent a lot of time studying it. It was a serious problem in Vietnam that has resulted in many deaths over a long period of time. Now keep in mind, just because you die 25 years later from something you got on the battlefield, it is still as relevant as if you get hit in the head with a bullet. And just because it is subtle, let us not duck it and bob and play little games here.

Our Vietnam veterans are still dying. For example, as I was writing this speech yesterday, I got an emergency call from a former marine in Houston, Texas, that is dying from agent orange that cannot get any kind of reasonable help through the Veterans Administration. With his own money, he went to M.D. Anderson Hospital, which is one of the best places in the world to go. Then he tried to get help from them. You see the flaws in the system?

OK. So the worst thing that we can do to these men, if you want to hit them in the face, is call what they have stress. I have worked with the U.T. Southwestern School since the mid-1980s, funding their research. Southwestern is one of the most respected medical institutions in the United States.

It has four Nobel prize recipients actively working in research today, more than any other medical school in the world, part of it involved with Desert Storm syndrome. I have worked for over 10 years with Drs. Brown and Goldstein, who were two Nobel prize recipients, whose research on findings in cholesterol have had a worldwide impact on controlling heart disease.

Now again, I want you to know this about Southwestern. I have called them again and again and again since the mid-eighties. Panama. Let us just take all of them that we have been through. Haiti. Every single situation, we had people with serious problems. A

who's who of the military would call me and say: You have to take care—I love this. Generals and admirals calling you concerned about their privates.

Now if we had that sort of—and their seamen. It just—it goes on and on. But they would call. Southwestern would step in. The top people would look at the people. Again and again they would treat them successfully, and in many cases never even send a bill to anybody for it. It was their way of saying thank you for your service.

That is the reason I asked Southwestern to put together a team. They selected Dr. Haley. You have heard his background. I will not go through that again. He spent months analyzing this. He started out in a very skeptical way, like a good detective, and just gathered the facts. And you have heard his conclusions here today.

One thing I want to make very clear. You start with small studies, and then you come up with what looks like might be a good, solid idea. And then you spend all your money. And that is the approach he has used. And that is the approach that has been successful again and again and again.

Senator SPECTER. Mr. Perot, how much longer would you take for your testimony?

Mr. PEROT. I will stop right quick and just say that our challenge—we have had a 10-year delay. It is caused by a group that has branded this stress and wants to keep it stress, no matter what. And I think the only way to get this program moving is to come up with a new plan, where they work either for the National Institute of Health or the Center for Disease Control.

And certainly they cannot be reporting into this group, because it is a non-responsive group. Sometimes we have waited up to 18 months to get the things we need. And if you are working on some of these things, you need a quick response and keep moving.

We also have had—and I do not think anybody has mentioned this. Only in America would we waste taxpayer money on a 150—let me see. I think it is $150 million that they have spent so far on public relations trying to sell the stress idea, and at one time had even hired a guy that was a lobbyist for the tobacco industry. There is no more negative thing I think you could do, in terms of offending a person who was wounded by this.

Now let me close my comments now and take your questions. Sorry if I overran.

Senator SPECTER. Well, thank you very much, Mr. Perot. We thank you for your leadership on the issue. And the frustration which you expressed Senator Hutchison had commented on, and I had, too, after our first panel.

STATEMENT OF CAPTAIN JULIA DYCKMAN, U.S. NAVY RESERVE (RETIRED)

Senator SPECTER. We have one more witness before we are going to turn to questions. And that is Captain Julia Dyckman, who served in the Persian Gulf war at Combat Fleet Hospital 15. Commander Dyckman was on active duty in the Persian Gulf for 5 months and suffers from Gulf war syndrome.

You were a commander at the time, a captain now. We welcome you here, Captain Dyckman, and look forward to your testimony.

Captain DYCKMAN. You have to bear with me, because I do have Gulf war illness. So I have a lot of the results of the damage that the rest of the vets have.

I would like to graciously thank the subcommittee for allowing me to testify regarding the appropriation of funds for research and treatment of Persian Gulf illness. At the time of the Persian Gulf, I was a commander with Naval Reserve Fleet Hospital 15. And it was a 500-bed hospital, and it was assembled at the site west of Al Jabar, Saudi Arabia.

When I came back, I have 21 medical diagnoses given to me by the Navy as a result of my Persian Gulf experience. I am on what they call TDRL, which is a temporary disabled retired list, which gives me 90-percent disability from the military and 100 percent from VA, because I am unemployable. As for these 21 diagnoses, you can find them in my written statement, which I will be providing.

Now you have to remember I had a complete military physical when mobilized and was in excellent health before leaving the United States. However, after 9½ years what is important is not these particular diagnoses, but the unique findings in myself and other veterans who have received advanced diagnostic procedures.

The advanced tests have shown that we have hypercoagulability, nerve damage, abnormal PETs and MRSs now, decreased circulation throughout the whole body, degenerative bone disease, mitochondrial changes in muscle tissues, abnormal immune lab results, and an increased number of various autoimmune diseases.

Laboratory tests and biopsies have shown organisms such as microplasm cytomegalovirus, abnormal levels of antibodies to a chemical compound called squalene, herpes six viruses, and now newly discovered stealth virus, and even a fraction of the HIV envelope. Discovery of these results required very specific tests, but DOD, VA or NIH did not provide these tests.

In my personal experience, I have dealt with DOD, VA and the National Institute of Health. I do want to say one other thing, though. Another problem I found is that an organization cannot investigate itself, if that organization possibly caused the problem in the first place. In other words, the fox should not watch the henhouse.

Now, I am willing to give some examples of the problems I have had with these organizations and their protocols. And you can read some of the other ones in my written testimony.

First of all, DOD. Its major failing is that it acts as if it thinks it is guilty of something and thus becomes defensive. It seems to predetermine the results at once, and so spends millions proving that any abnormality or the cause either does not exist or is not the responsibility or the result of DOD action.

DOD did have a proper protocol via the Comprehensive Clinical Evaluation Program to actually determine the causes of Persian Gulf illness. However, for whatever reason, they did not follow their own protocol. And hence, the CCEP program became useless.

Now here are some examples that I have encountered. In September of 1997, Mr. Rostker signed a letter, which was sent to me, regarding events in and around the Al Jabar area. I was with the Seabees that Dr. Haley is talking about. The Seabees stationed

there had parts of their t-shirts and combat boots turn purple and also sought medical treatment after being exposed to airborne unidentified noxious fumes.

DOD's assessment was that these personnel were definitely not exposed to chemical warfare agents. Lab findings said that the change could be a result of bi-products of industrial area operations, such as a fertilizer plant, which was located nearby. OK. It was not a chemical warfare agent, but it was chemicals. Anyone who lived near Bhopal, India, knows what a chemical will do.

The DOD has also spent many years and several million dollars proving that the soldiers and the marines that had chemical burns, well, they simply did not. I find it interesting that they can go back almost 10 years and determine by reading valid medical records written by on-the-scene examining physicians that the doctors were simply mistaken.

In 1996, a research team found that higher-than-normal levels of squalene were present in Gulf war veterans and that the source of this squalene was probably immunization. The DOD said wrong. However, just recently, DOD stated that there are low naturally occurring levels of squalene in the anthrax vaccine. DOD's credibility is shot.

VA. The VA is controlled by cost. They have a fixed budget. And this seems to result in a priority to minimize disability compensation by proving that you do not have a service-connected disability. They cannot afford to do proper research or even allow expensive or unique tests. Medical care and lab results are unpredictable and unreliable. They do not have the specialists necessary for proper care. And it seems when they get someone who is that specialist, they are let go, except in psychiatry.

Now, an example: I participated in a VA study at the University of Pennsylvania. And they were doing whole body PETs and a xion study to assess muscle blood flow in the legs. The results showed that I had decreased blood flow to certain areas of my body and inflammatory muscle disease. However, their funding was not renewed, and the physicians were discharged.

The VA did get funding to perform this blind study involving microplasm and doxycycline. I applied to be in the study. I did test positive for microplasm, but I had taken doxycycline a number of years ago, and they said I was ineligible to participate in the study.

As for the study on exercise, the study was limited to the Philadelphia area. And so to participate in this study, I would have to drive 2 hours to Philadelphia, exercise, and drive 2 hours home. I have inflammatory muscle disease and chronic fatigue. This would have been impossible for me and other veterans with Persian Gulf illness.

Senator SPECTER. Captain Dyckman, how much longer will your testimony be?

Captain DYCKMAN. Quite a bit longer, if that is at all possible.

Senator SPECTER. Well, could you summarize it for us, please?

Captain DYCKMAN. OK. I will skip then some of the other examples. But NIH, I had problems with their recording of the results. And they ended up being tied into Bethesda Naval Hospital. When the results did not meet their criteria, they never sent another veteran over to this particular study.

Here is my recommendations. It will take me 2 minutes.

Remove DOD and VA as designers of the research. They are valuable for their input, and they can provide goal setting. And they need to be involved by following the research and suggested protocols, plus providing referrals of their veterans to appropriate researchers.

Some of the doctors that I have dealt with that have produced some of the abnormal results, and they have also given me some relief. Dr. Pam Asa discovered squalene in my blood several years ago. Research needs to find out where the squalene came from.

Dr. Bronswager in the area of neurological effects and treatment has been effective in developing preventive measures to reduce flare-ups of the illness. Dr. John Martin of the Center for Complex Infectious Diseases has detected stealth virus in my tissues through blood work and biopsies. His research has possibility in linking viral and bacteriological organisms to the cause of Persian Gulf illness.

Dr. David Berg of Hemex Corporation has developed a valuable test to prove the hypercoagulability of some veterans. His results are being published this month. Dr. Kathleen Hannen, along with Dr. Berg, have developed a protocol for treatment for hypercoagulability in Persian Gulf illness. I am presently undergoing treatment using heparin, as well as the transfer factor in this new protocol.

One last area in funding for treatment and testing, the average Persian Gulf veteran and his family cannot obtain either the testing or treatment for their various illness. Since the illness is not named, most insurance companies and/or Medicare will not cover their testing and treatment. The illness must be named now.

PREPARED STATEMENT

Persian Gulf illness is called an undiagnosed illness. No one pays for testing or treatment of an illness that might not be there. After battling for years, I am better off now than when I started in 1991. This is mainly due to interest and kindness of private researchers, often unfunded. I feel like my government has left me out in the cold after many years of service.

[The statement follows:]

PREPARED STATEMENT OF JULIA Y. DYCKMAN

I would like to graciously thank the Subcommittee for allowing me to testify regarding the appropriation of funds for research and treatment of Persian Gulf Illness.

My name is Julia Dyckman and I am a Persian Gulf and Vietnam veteran. Currently I am a Captain, USNR on TDRL. TDRL means I am on the Temporary Disabled Retired List from the US Navy with a 90 percent disability rating. The VA considers me 100 percent disabled unemployable. I am an unemployed registered nurse, Pediatric Nurse Practitioner, and have a MPH from the University of Hawaii School of Public Health.

I would like to describe my experiences as a Persian Gulf vet who became ill while in the Persian Gulf and has been trying to get help for the last 9½ years. Throughout these years, I had to deal with the Department of Defense (DOD), Veterans Administration (VA) and other organizations, becoming a participant in some research programs as well as a few treatments protocols.

At the time of the Persian Gulf war, I was a Commander in the Naval Reserve who was activated January 16, 1991 to serve at Combat Zone Fleet Hospital 15.

Fleet Hospital 15 was a 500-bed hospital. It was assembled at a site west of Al Jubayl, Saudi Arabia.

I have received a total of 21 medical diagnoses from the Navy as a result of my Persian Gulf experience, they are:

—Diffusely increased sympathetic nerve traffic with increased sympathoneuronal outflows due to autonomic nervous system dysfunction
—Hypertension secondary to the above
—Resting tachycardia
—Hepatitic steatosis and bile stasis
—Chronic cholecystitis
—Right upper quadrant intra-abdominal adhesions
—Reflus esophagitis
—Chronic gastritis/duodenitis
—Irritable bowel syndrome
—Chronic diverticulosis
—Chronic abdominal pain due to above diagnoses
—Menometrorrhagia
—Polyclonal gammopathy of unknown significance
—Cephalgia
—Abnormal brain magnetic resonance imaging
—Cognitive dysfunction
—Fibromyalgia
—Symptom complex compatible with chronic fatigue syndrome
—Plantar fasciitis
—Perifollicular dermatitis
—Post-traumatic stress disorder

Remember that I had a complete military physical when mobilized and was in excellent health before leaving the United States.

However, after 9½ years, what is important is not these particular diagnoses but the unique findings in myself and other veterans who have received advanced diagnostic procedures. The advanced tests have shown that we have:

—hypercoagulability
—nerve damage
—abnormal PETS and MRS's
—decreased circulation throughout the whole body
—degenerative bone disease
—mitochondrial changes in muscle tissue
—abnormal immune lab results
—increased numbers of various autoimmune diseases.

Laboratory tests and biopsy results have shown organisms such as:

—mycoplasm
—cytomegalovirus
—abnormal levels of antibodies to a chemical compound called squalene
—herpes VI virus
—newly discovered stealth viruses
—fractions of the HIV envelope

Discovery of these results required very specific tests but DOD, the VA, or NIH does not routinely run these tests.

This combination of unique abnormal findings is important in determining the cause of the Persian Gulf Illness. Finding the cause is necessary so that funding and research can be directed to the organizations that have the attitude, desire, and strategy to find a cure or at least a treatment that leads to a better quality of life. An organization cannot investigate itself if that organization possibly caused the problem in the first place. In other words, the fox should not be watching the hen house.

In my personal experiences I have dealt with the DOD, the VA, and the National Institutes of Health (NIH). These were the only organizations available to me after my return from the Persian Gulf. Frankly, I do not understand their working interrelationships and their inability to be objective when it comes to Persian Gulf Illness.

Department of Defense.—Its major failing is that it acts as if it thinks it is guilty of something and thus becomes defensive. It seems to predetermine the results it wants and so spends millions proving that any abnormality or the cause either doesn't exist or is not the responsibility or the result of DOD action. DOD did have the proper protocol, via the Comprehensive Clinical Evaluation Program (CCEP), to actually determine the causes of Persian Gulf illness. However, for whatever reason they did NOT follow their own protocol and hence the CCEP became useless. Examples of DOD problems are:

In 1997, Mr. Rostker signed a letter regarding events in and around Al Jubayl, Saudi Arabia. Seabees stationed there had parts of their T-shirts and combat boots turn purple and also sought medical treatment after being exposed to airborne unidentified noxious fumes. DOD's assessment was that these personnel were definitely not exposed to chemical warfare agents. Analysis by the Natick Laboratories said that the change could be as a result of by products of industrial area operations, such as a fertilizer plant, which was located nearby. OK . . . it was not a chemical warfare agent, but it was chemicals. Ask anyone who lived near Bhopal, India what a chemical will do.

The DOD also just spent many years and several million dollars "proving" that the soldiers and marines that had chemical burns—well they simply didn't. I find it interesting that they can go back almost 10 years and determine by reading valid medical records, written by on-the-scene examining physicians that the doctors were simply "mistaken".

In 1996, a research team found that higher than normal levels of squalene were present in Gulf War veterans and that the source of this squalene was probably immunizations. The DOD said "WRONG". However, just recently the DOD stated that there are low, naturally occurring levels of squalene in the anthrax vaccine. Since this vaccine is artificially created, how did the squalene magically appear? DOD's credibility is shot.

Veterans Administration.—The VA is controlled by costs. They have a fixed budget. This seems to result in a priority to minimize disability compensation by proving that veterans do not have a service-connected disability. If you are not service-connected, then the VA can charge your insurance, if you have any. They rob Peter to pay Paul; in other words, if they increase services in one clinic then they must reduce the staffing of another clinic. They cannot afford to do proper research or even allow expensive or unique tests. Being understaffed their medical care and lab results are unpredictable and unreliable. They do not have the specialists necessary for proper care and it seems when they get some physicians who find abnormalities they are let go, except in psychiatry. For example:

In 1997, I was seen at the Veterans Administration Medical Center, Philadelphia, Persian Gulf Clinic. Testing was performed at the University of Pennsylvania utilizing the "Whole Body PET" and a "Xenon Study to Assess Muscle Blood Flow in the Legs". The results showed that I had decreased blood flow to certain areas of my body and Inflammatory Muscle disease. This was consistent with what they had seen with other Persian Gulf veterans and was decidedly different than other non-Persian Gulf veterans. However, their funding was NOT renewed and the physicians were discharged.

The VA did get funding to perform a blind study involving mycoplasm and doxycycline. This study was limited to the Philadelphia area. I was not accepted into since I had used doxycycline in the past, even though I was positive for mycoplasm. The VA was also running a study on exercise and illness for the Persian Gulf vets, this was also conducted in the Philadelphia area. To participate I would have to drive 2 hours to Philadelphia, exercise and drive 2 hours home. I have inflammatory muscle disease and chronic fatigue. This trip would have been physically impossible for myself or any other out-of-area veterans. The VA said they had no way to transport me or to have their program go outside the Philadelphia area. Hence, their research study is artificially limited.

The VA just recently had me wear a heart monitor to see if my heart problems were continuing. However, it took over a month and a half to get the results read. Those results stated "normal sinus rhythm" and "no sustained arrhythmia's". The test showed that I had sinus tachycardia with heart rates ranging from 53 to 148, however these results were not explained. Of course sustained arrhythmia means I am dead.

The VA performed a biopsy of my right leg. Do you know I have a kidney in my leg? The VA results said they found "a small floater of kidney tissue" and that they could rule out "tuberculosis or fungus as a cause". This is unacceptable.

The VA also said in their records, after performing an x-ray of my back, that ". . . he did not show up for the test".

These laboratory results show sloppy lab work, poor performance, and are totally useless.

National Institutes of Health.—I only dealt with NIH once. Their clientele comes from controlled sources. In my case this control meant that their study was not truly independent and hence their results could be tainted with DOD influence. For example:

Beginning in 1994 the Department of Defense evaluated me over a three-year period. During the CCEP, Bethesda Naval Hospital sent me to the NIH in an effort to verify that my conditions were caused by "stress". The very lengthy and invasive

procedures found that I had "autonomic nervous system dysfunction". During my interview process, I remarked that I thought that I had been exposed to chemicals. However, NIH, in their final report to me recorded that I said I was NOT exposed to chemicals, among many other errors. It could have been an honest mistake except that. their procedures would not allow me to correct the records. All they said was that my rebuttal would be retained in my record. This culminated in a toned down final result. However, since my results did not support the Navy diagnosis of "stress", the Navy never sent ANY other Persian Gulf veterans to NIH for evaluation in this specific area.

I am sorry, but giving funding to governmental bodies such as NIH, the VA, or DOD is like taking your life-savings and giving them to a bear. He will merely bury it in the woods and . . . believe me . . . you will get no return on your investment and you will not even get back your initial investment. My experiences support the contention that these and similar agencies have one focus . . . to prove that there is NO ILLNESS, that there are NO ABNORMAL indicators, and that there is NO PROBLEM except a psychiatric one caused by the veteran himself.

The following are my recommendations.

Remove DOD and VA as designers of any research. They still have an important role to provide data and other assistance during the research. They need to be involved by following the research and suggested protocols plus providing referrals of their veterans to researchers.

The following are private doctors and researchers that have helped me. They offer various avenues of research that should be explored.

—Dr. Pamela Asa who discovered squalene in my blood several years ago. Research needs to continue to find out where the squalene comes from.

—Dr. William Baumzweiger in the area of neurological effects and treatment. He has been effective in developing preventative measures to reduce flair-ups of the illness. He has used medications as well as other treatments that are helpful in stopping progression of Persian Gulf symptoms.

—Dr. John Martin of the Center for Complex Infectious Diseases. He has detected stealth viruses in my tissues through blood work and biopsies. His research has possibilities linking viral and bacteriological organisms to the cause of Persian Gulf Illness.

—Dr. David Berg of HEMEX Corporation has developed a valuable test to prove the hypercoagulability of some veterans. His results are being published in a medical journal this month.

—Dr. Kathleen Hannan, along with the research of Dr. Berg, has developed a protocol of treatment for hypercoagulability and Persian Gulf Illness. I am presently undergoing treatment using heparin as well as a "transfer factor" in a new protocol. The medication and specific lab tests are very expensive.

—Dr. Garth Nicolson. He has been effective in working with mycoplasm.

One last area is funding for treatment and testing. The average Persian Gulf veteran and his family cannot obtain either the testing or treatment for their various illnesses. Since the "illness" is not named, most insurance companies and/or Medicare will NOT cover this testing and treatment. The illness must be named . . . right now. Persian Gulf illness is called an "undiagnosed illness," no one pays for testing or treatment of an illness that "might not be there!"

After battling for years I am better off now than when I started in 1991. This is mainly due to the interest and kindness of private researchers, often unfunded. I feel like my government has left me out in the cold after many years of service. As a veteran of two wars I shouldn't have to beg to get truthful answers, expensive diagnostic tests, proper medical care, or essential treatment.

Senator SPECTER. Captain Dyckman, we would be interested to know precisely what symptoms, what ailments, you have suffered as a result of your exposure and your Gulf war illness.

Captain DYCKMAN. I have hypercoagulability. I have autonomic nervous system damage. I have uncontrollable blood pressure. I have irritable bowel syndrome. I have stomach ulcers. I have brain lesions. I have degenerative bone disease. I have had to have a total hysterectomy in a pre-cancerous state. I have had to have my gallbladder removed. I have a foot of my colon removed. And I have chronic headaches, chronic sinus and chronic fatigue, fibromyalgia. And those are the main ones.

Senator SPECTER. Have you been accorded treatment by the Veterans Administration, when you have taken those ailments to them?

Captain DYCKMAN. No. There is certain protocols that I bring in from outside doctors. And they usually have their pile of the research.

Senator SPECTER. But do they deny you medical treatment, or is it a matter of your being dissatisfied——

Captain DYCKMAN. No.

Senator SPECTER [continuing]. With what they have done?

Captain DYCKMAN. It is not a denial of treatment in its acceptance of what is wrong with you. I had some tests done——

Senator SPECTER. They doubt your complaints?

Captain DYCKMAN. Right. I had—an example was I had the biopsy to send the muscle tissue out to John Martin. What the VA said in their pathology report is that I had kidney tissue in my leg and that it was not caused by tuberculosis or fungus. Those are the kind of results that people are saying. It made no sense. It was improper. It was unprofessional. It was inaccurate. When you go——

Senator SPECTER. Let me move over to Dr. Haley for a question or two here.

Dr. Haley, is the long and short of the charts you showed us and your medical research that you find a connection between the symptoms complained by the Gulf war veterans and Gulf war illness a Gulf war syndrome?

Dr. HALEY. Right. In the group that we studied, it appears there is an injury in brain cells in just that area of the brain that would cause the symptoms of Gulf war syndrome, the——

Senator SPECTER. So your conclusion differs from the other studies in that you do in fact find cause and effect as a professional conclusion from your studies as a research scientist.

Dr. HALEY. That is correct, although those have to be replicated in larger studies. But to the extent that we have done it in this unit, we think that is correct.

Senator SPECTER. Well, are your studies sufficient to lead you to a professional judgment on cause and effect?

Dr. HALEY. Complicated issue. I think I would say, I would conclude that in this group of people we studied, in this Seabees unit, yes, that is correct. There is a cause and effect relationship in this group. Now whether that can be extrapolated more broadly to how many veterans, that requires an actual sample survey to have a valid result. But in this group, we think there is a cause and effect relationship.

Senator SPECTER. Well, what sort of an additional study are you talking about?

Dr. HALEY. OK. We have proposed taking a random sample, about 3,000 of the guys who went over, a random sample of those who did not go over from a computer tape of personnel during the war, which is available. We have designed a telephone survey. The Pentagon spent $500,000 with us to design this survey.

Senator SPECTER. Well, Doctor, let me cut through. I am at a little bit of a loss. You have conducted certain studies.

Dr. HALEY. Right.

Senator SPECTER. And you say there is cause and effect. Why not stop there?

Dr. HALEY. Scientifically sometimes what you get in a smaller sample may not be true of a larger group. It is just in science we know some things that look really good in a small group turn out to fizzle when you go bigger. So you have to do that.

Senator SPECTER. Well, Doctor, quantify the small group and quantify the big group.

Dr. HALEY. OK. Right. We studied 249 veterans in the Seabees unit, 63 of them had 1 of our 3 Gulf war syndromes.

Senator SPECTER. How many would constitute—we are trying to move ahead here.

Dr. HALEY. Right.

Senator SPECTER. How many——

Dr. HALEY. Three thousand in each group in a telephone survey and then take small random samples from the sick and the well in those, about 100.

Senator SPECTER. Dr. Sox, what do you think of Dr. Haley's testimony?

Dr. SOX. Well, our committee concluded that the evidence that linked PB to long-term health effects——

Senator SPECTER. Are you familiar with Dr. Haley's studies?

Dr. SOX. We reviewed Dr. Haley's studies. He had an opportunity to testify before our committee. We engaged in a very fruitful discussion with Dr. Haley about his work.

Senator SPECTER. What do you think of his conclusion on cause and effect?

Dr. SOX. Well, it does not meet the criteria established by the Institute of Medicine for cause and effect, the same criteria that had been used in scientific studies for the past 50 years, that were used in the Vietnam War——

Senator SPECTER. Would his elongated study, expanded study, meet the Institute of Medicine's criteria for cause and effect?

Dr. SOX. I do not believe so. And the reason I do not believe so is that in order to establish cause and effect, you have to show that the bigger the exposure, the bigger the effect. And that has been sort of an important principle of scientific inference for 50 years. And because we do not have reliable information on the degree of exposure in veterans of the Gulf war, I do not think he is going to be able to meet our criteria.

Senator SPECTER. My red light went on in the middle of Dr. Sox's answer. So I am going to yield to Senator Hutchison. But we will have a second round.

Senator HUTCHISON. Because I would love for you to finish that thought, because it seems to me that we are very close here to having some common sense be put on this issue.

Let me ask you, Dr. Sox, if you are not persuaded with the obviously small sampling, but with the scientific basis that Dr. Haley has shown for his presumptions, are you impressed with that little study?

Dr. SOX. The study still has—and I am speaking for the committee now and for our conclusions. The study still has some problems. No information on exposure. We do not know the exposure of the veterans that were in his study by any reliable means.

Senator HUTCHISON. Let me ask you——

Dr. SOX. We do not have unexposed group that never even went into the theater of war. And it is possible that the effects that Dr. Haley observed occur in people who did not go into that theater of war.

Senator HUTCHISON. Do you think that his research is a nugget on which you could put together a bigger proposal that might—maybe we do not need to talk about the legal definitions of causal connection. Maybe we just need to say, what is the next step to what is clearly a scientific finding that appears to be—would you not say it is a well-done study that could be built upon?

Dr. SOX. Well, I want to emphasize that our committee has a lot of respect for what Dr. Haley is doing. And we feel that his findings represent an interesting observation that, first of all, needs to be replicated in a more representative population.

But we also believe it needs to be replicated by other investigators. It is a paradigm of science that somebody makes a finding, and then other people check it to be sure that they can reproduce it before it really becomes regarded as scientific truth.

Senator HUTCHISON. So the next step would be to take that basic finding and perhaps get others, outside independent sources, that might replicate it or have similar studies to see if that, in fact, comes out again with a different group.

Dr. SOX. Yes, Senator.

Senator HUTCHISON. Would you think that would be a worthy next step?

Dr. SOX. I do.

Senator HUTCHISON. So you think the research he has done is worthy of pursuing the next step that would be to see if this finding had merit.

Dr. SOX. Yes. Our report contains a statement that these findings require further study with improved study design. So that was the conclusion of our committee.

Senator HUTCHISON. Do you think that the proposal that Dr. Haley made of expanding his efforts would also add to the body of knowledge, going the next step perhaps?

Dr. SOX. Well, since I have not had a chance to really look at the research protocol carefully, I think it would be inappropriate of me to make any statement——

Senator HUTCHISON. On that particular study.

Dr. SOX [continuing]. On that score. Yes.

Senator HUTCHISON. Well, let me ask you this: Do you think that the—let me say, in your study you looked at peer-reviewed scientific publications. But you specifically did not look at any classified military data, battlefield reports, eyewitness accounts. That was not in your purview, is that correct?

Dr. SOX. That is correct.

Senator HUTCHISON. So you were not able to even look at the check observations of the Khamisiyah ammunition dump. You were not able to put any of that into your factoring as eyewitness accounts.

Dr. SOX. That is correct.

Senator HUTCHISON. Do you think that with your studies just on the scientific reports, in which you said there was limited sugges-

tive published evidence that low level sarin, in enough concentrations to cause immediate symptoms—I think I am quoting the report—could leave someone with permanent brain damage that would cause chronic symptoms like Gulf war syndrome, do you think that with that conclusion, and then with the added battlefield eyewitness account information, and then with the large number of veterans who have come back, that we should pursue the studies that would be focused on trying to determine that this a syndrome, that we would then begin to focus on causal connections and from that would come treatments?

Dr. SOX. Well, before we could draw a cause and effect relationship between exposure to sarin and these long-term symptoms, which have a lot in common with the symptoms reported by veterans with unexplained Gulf war illness, we would have to establish that the veterans who had these long-term symptoms also had the short-term syndrome. That would be a formidable task, to establish that with certainty, given that there has been 8 years passage of time since the exposure actually occurred.

So I think it would be quite a challenge to accumulate credible evidence that this veteran experienced the acute symptoms and this veteran did not. So in theory, I think it is possible. In practice, I think it is going to be difficult to get really credible scientific evidence on that point. But that would be the direction that you would want to go.

Senator HUTCHISON. Yes. I was just going to say, you are a scientist. We have one in seven people in the last conflict in which America was involved, who have some kind of malady. We are looking at the future. We are looking at how we can best equip ourselves to fight the next conflict, in which it is very likely that chemicals will be involved.

You are the scientist. You just said, finally, that you think we should pursue this direction. What would you lay out as the next step to take to do our duty, my duty, to make sure that our men and women in the services have all of the equipment they need to do the job they are being asked to do, and that we protect them as we should?

Dr. SOX. Well, I am going to limit my response to something I am pretty confident of. And that is that in the next conflict we need to have much more precise information about who got exposed to what, when, and to what amount.

And when we have that information and then we track returning veterans' illness experience over time and try to link that to the exposures, we will be in a much better position to understand what are the environmental exposures that really make a difference. And then we are in a better position to protect against those.

Senator HUTCHISON. That is the future. And we certainly——

Dr. SOX. That is the future.

Senator HUTCHISON [continuing]. Have learned enough to do that. But what about now? And what about doing the best job we can to protect the people? I mean, I do not want to send them out there as guinea pigs to be the next test case. So what can we do now to give them the support they need to do this job?

Dr. SOX. I wish I could satisfy you with an answer that would lead to immediate action. But the only immediate action I am con-

fident is important is to lay the groundwork for better understanding in the future. And I just point out that it has only been a matter of 10 years that we have started to consider war as the possible progenitor of chronic illness.

So we are at the beginning of a quest for understanding that is going to take a long time, just as it has taken us 40 years to start to get our arms around the causative factors in cancer, for example.

Senator HUTCHISON. Dr. Sox, you and I will not disagree one degree that we need to do better data collection in the next war.

I would just maybe ask you, Dr. Haley, I am not satisfied to wait and send someone out without doing something now that will give them a better chance to have antidotes and also protection from the kinds of disease that we are seeing right now in one of seven veterans of the last conflict we had. What would be your suggestion for the next——

Dr. HALEY. Well, I think that the way we solved toxic shock syndrome, Legionnaire's disease and AIDS, as you pointed out earlier, is the formula. You know, what is interesting here is we are dealing with an epidemic. If there is anything going on here, it is an epidemic, one out of seven. What has been shown over 50 years of CDC research is epidemics are different than the way diseases occur in the general population.

In the general population, when you are studying cancer, heart disease, those are very difficult things to study. You have to have long-term, big studies with large numbers. In epidemics you do not need big studies, because you have a homogenous exposure and a very homogenous disease that are tightly connected. Otherwise it would not be an epidemic.

And looking at toxic shock syndrome, remember the Rely tampon was quickly implicated by a very small case control study, smaller than the one that we did.

Senator HUTCHISON. And the specific hotel in Legionnaire's disease.

Dr. HALEY. And Legionnaire's disease and the link with the air conditioning in the Bellevue Stratford Hotel. That was all done by self-reported risk factors. You get a group of cases who are sick and a group of matched controls and you give them a carefully worded questionnaire that gets at the possible risk factors, and you find out which risk factor did most of the sick people say they were exposed to and most of the well people say they were not.

Now, the reason that has not been done here is the people who have been in charge of all these studies, one, assumed from the beginning that it was a psychiatric disease. It was stress and psychological. And second, they do not trust veterans. They think veterans will lie and inflate. And so they never undertook those studies because they just did not believe they would work out.

Well, if they had used that logic when faced with toxic shock syndrome, Legionnaire's or AIDS—AIDS was cracked the same way, at least the risk factors. The behavioral risk factors were determined by self-reported risk factors.

What I would suggest is, even now, I think it is still time for us to mount 30 or 40 different case control studies, get a whole bunch of people who know how to do this, preferably former CDC people or people with a school of public health training, who know how to

investigate epidemics, and let them loose, as you mentioned, in every city in the country, and do a bunch of these and see if we can find some risk factor associations we would agree on.

Now this may not—I think Dr. Sox's points are very important. And I really appreciated their report. I think it was very carefully done. But the type of evidence that IOM is considering to be definitive evidence and to meet those criteria, those are much more excessive than the general view of science. Science generally goes when you have a whole bunch of studies that agree with each other that finally start reaching agreement. That mosaic of evidence is what generally tends to confront scientists.

Senator SPECTER. We are going to have to conclude this hearing——

Dr. HALEY. That is what I think we should do.

Senator SPECTER. We are going to have to conclude this hearing by noon. We have been at it now for 2¼ hours. I see Dr. Rostker shaking his head negatively in the back row.

Dr. Rostker, we are going to give you a chance to comment here. We do not want you just on the record here, head being shaken negatively. I had to step out for a minute. We are in the final stages of an appropriations bill for the Departments of Labor, Health, Human Services, and I have to turn to that, where we are trying to bring that to the floor tomorrow to see if we can get some funding for some of this stuff.

Dr. Sox, I could not be here. I conclude that Senator Hutchison solved the issues as between you and Dr. Haley. What do you think of his proposed expanded study to give an acceptable resolution of the cause and effect issue?

Dr. SOX. Well, first of all, I did not have a chance to look at the protocol. So all I can do is state in generalities that it is important to replicate his studies in a broader representative population that includes non-exposed veterans.

Senator SPECTER. Well, will you take a look at his protocol and give the committee a response?

Dr. Rostker, step forward here. Pull up an extra chair. Mr. Perot will lend you his microphone, even though he paid for that microphone.

He has paid for more than one microphone around here.

What do you think about Dr. Haley's study, Dr. Rostker?

Dr. ROSTKER. Well, let me——

Senator SPECTER. Or in the alternative, how are we going to come to a conclusion here?

Dr. ROSTKER. I anticipated that since Dr. Haley would be on the panel that you would be interested in our interactions. And I have a statement that I would like to have placed in the record. Moreover——

Senator SPECTER. We would be glad to have it placed in the record.

[The information follows:]

REVIEW OF THE DEPARTMENT OF DEFENSE'S INTERACTIONS WITH DR. ROBERT HALEY BETWEEN 1997 AND 2000

Thank you for this question, Mr. Chairman. While the stated purpose of this hearing is to "examine findings of the recently announced Institute of Medicine (IOM) study," I anticipated that since Dr. Robert Haley was included as a witness, ques-

tions concerning DOD's interactions with him might be asked. Accordingly, I have prepared a review of these interactions. These two notebooks contain the various correspondences between the Office of the Special Assistant for Gulf War Illnesses and Dr. Haley, and DOD's medical research community and Dr. Haley. I would like to make these notebooks available to the committee for your consideration.

In summary, we view our interactions with Dr. Haley over the last three years with disappointment and frustration. After going against our normal procedures and overriding the peer review and competitive process to provide $3 million to Dr. Haley, we have been frustrated in getting Dr. Haley to meet the terms of his research cooperative agreement. We have been faced with a constant barrage of lobbying by Dr. Haley and others on his behalf with the purposes of forcing the DOD to once again ignore its peer review process and provide additional research funds outside of the competitive grant system. This is even more disturbing, since, as a result of his lobbying, Dr. Haley's work has been reviewed by a number of independent groups charged with oversight of the DOD's Gulf War research efforts. These groups have not endorsed Dr. Haley's demands. They have consistently told the DOD not to override the peer review competitive process again. Moreover, the consistent theme of these reviews is the need to expand the sample beyond the original cohort that was the basis for Dr. Haley's original research. In fact, if Dr. Haley had complied with the terms of the DOD Cooperative Agreement (CA) he would have already met these critiques. In the CA he proposed to "determine whether the findings of study #1 can be replicated in an independent population of Gulf War veterans."[1] To date Dr. Haley has failed to provide an "expanded set of cases and controls" as required by his agreement with the Government.

At this point, if you would like me to continue, I would be pleased to provide direct testimony concerning our relationship with Dr. Haley. If you would prefer, however, my statement could be placed in the record. I would like, however, to call to your attention the scope of my statement. Specifically, my statement covers:

—Dr. Haley's initial lobbying, and our decision to award a noncompetitive contract for $3 million,

—The negative reaction to that decision from the Presidential Advisory Committee on Gulf War Veterans' Illnesses,[2]

—The independent assessment by a panel of the American Institute of Biological Sciences of Dr. Haley's first[3] and second[4] annual reports, and his response to this independent panel's assessment[5]

—And, the current discussions concerning future funding, including Dr. Haley's assertion that Senator Hutchinson has added funding to the fiscal year 2001 budget for his latest project. I note that the DOD has not received any guidance from the Congress for a new noncompetitive funding for Dr. Haley.

In addition to the issue of funding, the Government has had other interactions with Dr. Haley over the last several years. These include:

—A number of independent assessments of Dr. Haley's work that all make about the same point recently made by the IOM.

—Dr Haley has been the lone author of extreme criticisms attacking findings published in leading scientific journals by government and non government scientists both in the U.S. and abroad.[6][7][8][9][10] Given the highly technical nature of the exchange of statistical analysis used in the "American Journal of Epidemiology," I asked the RAND Corporation to prepare a technical assessment of the issues raised by Dr. Haley. Their review agreeing with the DOD and VA researchers is available to the committee.[11]

—Dr. Haley's attack on the veracity of researchers at the RAND Corporation because their review of the medical literature on "Stress" did not reference an article authored by Dr. Haley.[12] Dr. Haley believes his article is the definitive article on the subject.

—Dr. Haley's criticism of a paper on British Gulf War veterans, demanding its retraction, because it did not replicate his study.[13][14]

—My exchange of letters with Dr. Haley because he wrote and reported there were chemical agents on the battlefield.[15][16][17] He has not provided any documentation of that occurring and in his latest publication on September 14, 2000 reports ". . . sarin was documented in ambient air," on the battlefield.[18]

—Dr. Haley's claim to the Veterans of Foreign Wars that the Office of the Special Assistant has mounted a campaign to impugn his work[19] and the VFW's request that we provide additional funding to Dr. Haley.[20]

—Dr. Haley's assertion that there is strong evidence of an epidemic of ALS in young Gulf War veterans[21] and his request for special access to personnel records.[22] Additionally he has suggested the possibility of future Parkinsonlike syndromes among Gulf War veterans.[18]"

REVIEW OF THE COOPERATIVE AGREEMENT (CA) BETWEEN THE U.S. ARMY MEDICAL RESEARCH AND MATERIEL COMMAND (USAMRMC) AND DR. ROBERT HALEY

In 1997, Dr. Haley submitted a $12M research proposal [1] to the USAMRMC for a study concerning Gulf War-related illnesses. Dr. Haley submitted his proposal in response to a Broad Agency Announcement (BAA) (Announcement 95–1) which announced the availability of $10M of DOD funds for competitively awarded, peer reviewed Gulf War-related illnesses research projects. Dr. Haley's proposal was among 39 proposals received by the USAMRMC under the 95–1 solicitation.

The American Institute of Biological Sciences (AIBS), under contract with the USAMRMC, assembled a panel of independent, non-DOD scientists to peer review the scientific merit of the research proposals submitted under the 95–1 Announcement. [23] The panel assigned a low scientific merit score to Dr. Haley's proposal overall and recommended that only specific portions of the proposal met scientific merit criteria for funding. The Research Working Group (RWG) of the Persian Gulf Veterans Coordinating Board recommended against funding Dr. Haley's proposal based on its low overall scientific merit score and its cost exceeding the total funds available for the 95–1 solicitation. [24]

Following intense lobbying efforts by Dr. Haley, DOD agreed to make limited research funds ($3M) available to fund only those specific portions of his proposal that were deemed to be scientifically meritorious by the independent peer review panel. [25] This lobbying included a call by Mr. H. Ross Perot and visits to the Pentagon by Dr. Haley individually to the Service Chiefs of Staff and the Office of the Secretary of Defense. In order to be as open as possible, the Special Assistant for Gulf War Illnesses ordered funding for those portions of Dr. Haley's proposal that were judged by the AIBS to meet "scientific merit." The primary goal of the $3M project was to try to validate Dr. Haley's initial epidemiologic observations of six syndromes in 100 new individuals and to develop a hypothesis that could be tested. Validation requires confirming these initial observations with a new sample and comparing service members who deployed with those who did not. Accordingly, additional funds were provided above those allocated to the Persian Gulf Veterans Coordinating Board for the competitive medical research process. The PAC, however, noted "serious concern that a substantial amount of . . . (research) recently has been funded without undergoing external competition and peer review; it is immaterial to us that these funds did not come from the allocation set aside for the most recent solicitations and awards. [2]"

On September 30, 1997, the USAMRMC entered into a Cooperative Agreement (CA) [26] with the University of Texas Southwestern Medical Center at Dallas which provided $3M of DOD funds to Dr. Haley for research efforts on, "Multi-Disciplinary Pathophysiologic Studies of Neurotoxic Gulf War-related Syndrome Leading to Diagnosis and Treatment." The CA was for an 18-month period of performance ending March 29, 1999, but it allowed an 18-month extension with the mutual agreement of the parties. The CA requires Dr. Haley to provide the USAMRMC with annual progress reports detailing scientific issues and accomplishments. It also requires a final report detailing the findings and issues of the entire project.

Dr. Haley submitted his first annual progress report to the USAMRMC in October 1998, covering the period September 30, 1997 to September 29, 1998. [27] The AIBS, under contract with the USAMRMC, provided an independent scientific peer review of the annual report. The peer reviewers judged the report to be incomplete and difficult to evaluate without substantial additional information. [3] The USAMRMC returned the annual report to Dr. Haley in February 1999, requesting that he revise it to address the peer review comments. [28] They also expressed concern that Dr. Haley had not accomplished the primary task under the CA to expand his original sample to a total of 100 cases and controls in order to confirm his original findings. Dr. Haley responded to this request with an extensive written rebuttal to every point in the peer review report. [5]

In a conference call on March 18, 1999 between the USAMRMC and the University of Texas, Dr. Haley agreed to: (1) provide a more complete summary of his research in his next annual progress report; (2) submit a modest proposal for a validation study of his original findings to be considered for funding under the existing CA; (3) submit a modest proposal for a pilot study to work out methodology for a national survey; and (4) provide a detailed written request for permission to use DOD funding for those portions of his study which were conducted before he had completed DOD human use approval. [29] The USAMRMC agreed to authorize an 18-month no-cost extension to the CA and to approve his use of the existing funds to purchase additional equipment to enable Dr. Haley to more efficiently analyze his data. On April 1, 1999, USAMRMC granted the 18-month no cost extension of the

CA. [30] The current period of performance is September 30, 1997 to September 30, 2000.

Dr. Haley submitted his second annual progress report in October 1999, covering the period September 30, 1998 to September 30, 1999. [31] The USAMRMC obtained an independent scientific peer review of this report from the AIBS and received the review comments in April 2000. The reviewers concluded that this latest report was substantially unchanged from the previous annual report. They also expressed concerns that the report lacked adequate data to permit a thorough analysis of the progress of this project. [4] In a letter, dated August 10, 2000, [32] the USAMRMC provided these comments to Dr. Haley and requested that he review the comments and prepare a final report which is comprehensive in the analysis and reporting of the results from the experiments conducted under this CA. In their letter to Dr. Haley, they also proposed a site visit on October 30, 2000 by personnel from the USAMRMC's Regulatory Compliance and Quality Directorate to review all data gathered during the project and to discuss compliance with human use procedures. Dr. Haley has agreed to the site visit.

Notwithstanding the incomplete status of the CA, Dr. Haley has submitted a new proposal entitled "Establishment of a Gulf War Illness Research Center" and he requested $25,253,397 for a 24-month period of performance. This is currently in scientific review by an external panel of experts. Dr. Haley has asserted to the DOD contracting officer representative that Senator Hutchinson (R-Tex) added funding to the fiscal year 2001 budget for his project. DOD has received no guidance on new, non-competitive funding directed in statute to Dr. Haley.

INDEPENDENT ASSESSMENTS OF DR. HALEY'S WORK

Over the years, there have been a number of assessments of Dr. Haley's work that all make the same point made by the IOM in their most recent review.

—In 1998 the U.S. Senate Committee on Veterans' Affairs' Special Investigation Unit on Gulf War Illnesses noted that:

"[Dr. Haley] conclude[s] that . . . [his] . . . results show an increase in nervous system impairment and a pattern consistent with exposure to specific neurotoxicants (Haley et al., 1997). Unfortunately, nearly all of these studies were performed on 'samples of convenience' and, as a result, cannot be used to draw conclusions about the larger but unstudied group of all Gulf War veterans. This body of literature has added little to the collective understanding of symptoms and health concerns among Persian Gulf War veterans. [33]"

—In June 1999, Dr. Haley testified before the Presidential Special Oversight Board (PSOB). [34] The PSOB consulted with Dr. Jonathan Samet, the Chairman of the Department of Epidemiology of the Johns Hopkins University, School of Hygiene and Public Health. On June 24, 1999 Dr. Samet wrote the PSOB:

"To recapitulate the story of Dr. Haley's research, . . . he has moved rapidly from a descriptive study to research for exposures causing various Gulf War syndromes, and even to the potential genetic basis of these syndromes. He also mentioned clinical trials of therapeutic agents. The pace of this work is breathtaking and perhaps warranted by the needs of the Gulf War veterans. On the other hand, needed, confirmatory work by others has not yet taken place. . . .

"In spite of Dr. Haley's enthusiasm, I do have concerns about some of the findings. As I pointed out earlier this week in my remarks to the Board, Dr. Haley has been using poorly specified outcome measures, symptoms and syndromes, and exposure variables that represent surrogates for unknown agents. There must be misclassification (error) affecting both exposures and outcome and consequently the finding of extremely strong associations between the outcome measures and the putative exposures is surprising. For example, the use of flea collars is likely to be an inaccurate indicator of exposure to the insecticides in the collar. One explanation for the findings that cannot yet be discarded is the possibility of information bias, that is, persons who report symptoms are also more likely to report exposures.

"Dr. Haley has outlined an ambitious program of research. Assuming that his research agenda moves forward, I suggest that a coordinated program of research be developed that will assure replication by others at each stage. Lacking such coordination, there is every potential for further contentious debate that cannot be appropriately resolved with evidence. Additionally, appropriate oversight should be developed for Dr. Haley's program to assure that proper peer review and guidance is maintained throughout. Like many projects on controversial topics with substantial public policy implications, independent oversight enhances the credibility of the research and the researcher." [35]

It is important to note that in the Cooperative Agreement with DOD Dr. Haley "proposed following up promising findings from our prior research . . . by applying an extended battery of . . . tests to our sets of cases and controls and to test the external validity of our prior findings in new populations of Gulf War veterans."[1] To date Dr. Haley has failed to provide data on an "expanded set of cases and controls."

DR. HALEY'S REVIEW OF WORK PUBLISHED BY DOD MEDICAL RESEARCHERS

In 1998 Dr. Haley published in the "American Journal of Epidemiology" a critique of published work by DOD and VA researchers raising not only technical points, but also inferring the government sponsored research among Gulf War veterans cannot be trusted.[6] The author's responses[7][8][9] and Dr. Haley's criticism of their responses were also published.[10] Since these were very technical statistical arguments, outside of the competence of the Office of the Special Assistant, we asked the RAND Corporation, a Federally Funded Research and Development Center for DOD to review the arguments and to advise us accordingly. Their review concluded Dr. Haley's formulation exaggerated the precision of statistical measures, ignored numerous sources of error and constituted an unsatisfactory basis for statistical analysis. The RAND analysis concurred with the rebuttals of Dr. Haley's criticisms by DOD and VA authors. [11]

AN ATTACK ON THE VERACITY OF RESEARCHERS AT THE RAND CORPORATION

Independent of the above and on an entirely different subject, Dr. Haley attacked the veracity of researchers at the RAND Corporation because they did not include an article he had written in their review of the medical literature on "stress." Specifically, Dr. Haley wrote the President of the RAND Corporation:

"I wish to bring to your attention what appears to be a most grievous abuse of the scientific process which may constitute scientific misconduct on a federally sponsored project within the RAND Corporation. . . . The RAND authors represent the monograph as a complete review of the scientific literature on the issue of the possible role of psychological stress in causing physical or psychological illnesses in Gulf War veterans. . . . In the body of the monograph and its extensive bibliography, the authors did not cite my 1997 peer reviewed paper, 'Is the Gulf War syndrome due to stress: the evidence reexamined. . . .'

"'It would be unreasonable to assume that the RAND authors were unaware of my paper. . . . Therefore, it appears highly probable that . . . (the authors) and colleagues at RAND knowingly censored my paper from their review of the scientific literature and based their conclusions on evidence that was disqualified by my paper. . . .'

"In view of the excellent scientific reputation enjoyed by RAND, I trust that you will review this matter and take proper action to rectify the misconduct of your staff members and correct the misinformation."[12]

When the original RAND literature search was done, Dr. Haley's paper was not published. The peer reviewers of the first edition of this monograph[36] recommended including several recent publications on stress related to the Gulf War, including Dr. Haley's 1997 publication. The RAND internal review determined that Dr. Haley's work was indeed, not censured, but was just not available for the first edition on stress. Several of his publications were referenced in the second edition.[37] While noting Dr. Haley's contention that the PTSD rate is nearly zero in Gulf War veterans, RAND did not assess whether or not Dr. Haley's assumptions were correct or not. The RAND authors concluded additional empiric research is necessary to determine if PTSD in Gulf War veterans is zero or merely low.

CRITICISM OF BRITISH RESEARCHERS

Dr. Haley commented[13] on a paper done by British researchers evaluating the factor structure of the symptoms reported in a randomly selected UK Gulf War cohort from the factor structure of two other randomly selected cohorts. Dr. Haley contended he was never informed they had undertaken such an analysis to replicate his work. He then said they omitted 12 of his 23 symptoms, their mathematical methods of factor analysis were incorrect in at least three important respects and they used different factor weights. He contended they misrepresented their analysis as an approximation of his factor model and stated they should retract the paper. The British authors responded[14] that their Gulf War group was 3,225 individuals with a 70 percent response rate, while Haley's was 249 individuals with a 41 percent response rate. Further, they had two large control groups; Haley had none. The British found that subjective reporting of symptoms in the Gulf War cohort was

similar to the two other cohorts. The British contended that Haley was confused over the differences between exploratory factor analysis and confirmatory factor analysis. The British concluded that the model loosely based on his results did not fit well.

AN EXCHANGE BETWEEN DR. HALEY AND THE OFFICE OF THE SPECIAL ASSISTANT CONCERNING THE PRESENCE OR ABSENCE OF CHEMICAL AGENTS ON THE BATTLEFIELD

Last August (1999), I wrote Dr. Haley[15] of my concerns that he was making unsubstantiated statements concerning the use of chemical weapons during the Gulf War. I reminded him that UNSCOM[38] and CIA[39] had concluded from direct evidence that no chemicals were shipped south of Khamisyah. And I could add that the PSOB[40] and the Senate's own SIU[41] drew the same conclusion. Specifically, I noted that:

"Unsubstantiated statements concerning exposure to chemical warfare agents cause needless alarm and confusion among our Gulf War veterans and do them a great disservice. If you do have any verifiable evidence to support your claim that members of the Naval Mobile Construction Battalion 24 were exposed to chemical warfare agents, we are extremely interested and request that you provide us with copies and sources. Absent such evidence, I respectfully ask you to set the record straight. I know it was never your intent to unnecessarily alarm Gulf War veterans."[15]

Dr. Haley responded that:

"I generally say very little about the issue of actual exposures to chemical nerve agents during the Gulf War. . . . I think the ultimate source of the concerns may be the two scientific papers we have published that bear indirectly on the possible role of chemical nerve agent in one of the Gulf War syndromes. . . . I would not be surprised if the coverage (in the press) created some concerns, but there was really nothing I could do to avoid that other than to be careful not to go beyond our scientific findings in my public comments. I believe I have been very careful in that respect. I seem to recall that I only suggested nerve agent as a possibility, and no more, certainly a question that is on everyone's minds."[16]

In a return letter,[17] I pointed out that contrary to his response, he had repeatedly been quoted as making declarative statements to the effect that neurological "damage was caused by exposure to combinations of low-level chemical nerve agents and other chemicals." As recently as September 2000, Dr. Haley in a signed letter to the Veterans of Foreign Wars claimed that he has "evidence that sarin nerve gas was present in low concentrations among our troops.[19]" He also published a paper on dopamine activity in Gulf War Syndrome in which he states ". . . sarin was documented in ambient air," on the battlefield.[18] We know of no such documentation and would welcome this information for evaluation.

DR. HALEY'S CLAIM THAT THE OFFICE OF THE SPECIAL ASSISTANT HAS MOUNTED A CAMPAIGN TO DISCREDIT HIM AND HIS WORK

Last month (September 2000) Dr. Haley charged that:

"I am reassured by my colleagues here at UT Southwestern and in other Universities that had our discoveries been made in any other areas of medicine, they would have created immense excitement, generated feverish research by others throughout the country, and resulted in millions of dollars of grant funds coming to our universities to further the discoveries. For example, NIH would have encouraged us to submit a program project grant to accelerate the research along multiple tracks. These typically amount to $20–30 million each. Under withering fire from the $30 million per year OSAGWI counterattacks on us, however, our work has been largely obscured, unfairly impugned out of political motivations and greatly underfunded.[19]"

I know of no action by anyone in the DOD to impugn Dr. Haley's work. Such charges are completely without substance or merit.

On September 19, 2000, the VFW asked the Secretary of Defense to provide "additional government funding for expanded research" by Dr. Haley.[20] The PSOB advised the Secretary of Defense on September 25, 2000 that:

"The Board is not in a position to evaluate the validity of Dr. Haley's findings. We do believe that his findings are of interest and we support the concept that his work needs to be replicated by independent scientists not affiliated with Dr. Haley.

"We believe that when a scientist promotes and advocates his or her findings through political and/or public pressure, rather than by scientific replication and

confirmation, the objectivity of the subject scientific findings are called into question. There are well known efforts to obtain funding for research on behalf of Dr. Haley despite critical evaluations by peer reviewers. Dr. Haley's responsiveness to contractual requirements, based on funding that he obtained from the Department of Defense after "intense lobbying," has been the subject of past discussion. . . .

"The Board believes that the VFW, Dr. Haley and the University of Texas should welcome independent replication of the Haley's methods and findings. Independent verification will either validate his [Dr. Haley's] findings or validate the scientific critiques that address his work."[42]

DR. HALEY'S REQUEST FOR SPECIAL ACCESS TO PERSONNEL RECORDS TO STUDY ALS

On April 28, 1999 Dr. Haley asked our help in sending a letter "to veterans making them aware of the study we (Haley) are doing on ALS-like illness in military personnel.[43]" The DOD and the Department of Veterans Affairs responded on June 8, 1999 by (conference) call with Dr. Haley.[44] As a result of the call Dr. Haley provided (1) a protocol for review (2) IRB approval and (3) informed consent form which the VA would require for approval of his request. Subsequently, Mr. H. Ross Perot called the Chairman of the Joint Chiefs of Staff claiming that veterans of the Gulf War are ten times more likely to be suffering from ALS. Dr. Haley met with the Secretary of Veterans Affairs to discuss his project. Mr. Perot called the Secretary of Veterans Affairs and the Under Secretary for Health of the DVA to press Dr. Haley's case. On August 27, 1999 the Acting Under Secretary for Health of the DVA wrote Mr. Perot to explain:

"Dr. Haley had originally requested access to specific Gulf War veteran patient records, including patient identifiers, for the purpose of recruiting VA patients into his research study. The Department of Veterans Affairs (VA) cannot provide such information to Dr. Haley because it would violate the Privacy Act and the confidentiality of our veteran patients records. All of our veterans trust us to preserve their legally entitled privacy.

"An option would be for VA to conduct a blind mailing to targeted veterans to provide them information about Dr. Haley's proposed research, along with an invitation to contact him should they wish to participate in his research. . . . (However,) the material provided to VA thus far, including the research protocol and the informed consent document Dr. Haley proposes to use, does not provide sufficient assurance that VA patients would be afforded the twin protections that are due to them. . . .

"Because Dr. Haley's request is unprecedented, I am taking certain steps that will better afford VA the necessary assurance before we could consider agreeing to a targeted mailing to Gulf War veterans. . . . If the review groups approve the protocol with recommended changes in the protocol, Dr. Haley must satisfy their recommendations before VA will conduct a blind mailing.[22]"

To date Dr. Haley has not re-submitted a protocol, informed consent and Institutional Review Board approval that met the VA's requirements.

ENDNOTES

[1] Letter, dated 10 Mar 97, The University of Texas Southwestern Medical Center at Dallas, subject: Application for Support of a Research Grant entitled, "Multi-Disciplinary Pathophysiologic Studies of Neurotoxic Gulf War-Related Syndromes Leading to Diagnosis and Treatment," (response to MRMC Announcement 95–1).

[2] Presidential Advisory Committee *Special Report,* October 31, 1997.

[3] AIBS Review Comments, January 1999, Robert W. Haley, Annual Report Title: Multi-Disciplinary Pathophysiologic Studies of Neurotoxic Gulf War-Related Syndromes Leading to Diagnosis and Treatment.

[4] AIBS Review Comments, April 2000, Robert W. Haley, Annual Report Title: Multi-Disciplinary Pathophysiologic Studies of Neurotoxic Gulf War-Related Syndromes Leading to Diagnosis and Treatment.

[5] Letter, 26 Feb. 1999, Dr. Haley to LTC Friedl (USAMRMC) subject: Dr. Haley's response to the AIBS comments on the first annual report.

[6] Haley, RW, "Point: Bias from the 'Healthy-Warrior Effect' and Unequal Follow-up in Three Government Studies of Health Effects of the Gulf War," *American Journal of Epidemiology* (1998), pages 315–323.

[7] Gray, GC et al, "Counterpoint: Responding to Suppositions and Misunderstandings," *American Journal of Epidemiology* (1998), pages 328–332.

[8] Kang, HK et al, "Counterpoint: Negligible 'Healthy-Warrior Effect' on Gulf War Veterans' Mortality," *American Journal of Epidemiology* (1998), pages 324–325.

[9] Cowan, DN et al, "Counterpoint: Responding to Inadequate Critique of Birth Defects Paper," *American Journal Epidemiology* (1998), pages 326–327.

[10] Haley, RW, "Countercounterpoint: Haley Replies," *American Journal of Epidemiology* (1998), pages 334–338.

[11] RAND Report, *An Assessment of Technical Issues Raised in R.W. Haley's Critique of Three Studies of Health Effects of the Gulf War,* 2000.
[12] Letter, 15 Jul 99, Dr. Haley to James A. Thompson (RAND), subject: RAND publication *A Review of the Scientific Literature as it Pertains to Gulf War Illnesses, Volume 4, Stress.*
[13] Haley, RW, "Is there a Gulf War syndrome?," *The Lancet* (November 1999), page 1645.
[14] Wessely, S et al, "Authors Reply," *The Lancet* (November 1999), pages 1645–1646.
[15] Letter, 2 Aug 99, Dr. Rostker to Dr. Haley, subject: statements of Gulf War veterans exposure to chemical warfare agents.
[16] Letter, 7 Oct 99, Dr. Haley to Dr. Rostker, subject: response to 2 Aug 99 letter.
[17] Letter, 17 Dec 99, Dr. Rostker to Dr. Haley, subject: response to 7 Oct 99 letter.
[18] Haley, RW et al, "Effect of Basal Ganglia Injury on central Dopamine Activity in Gulf War Syndrome," *Archives of Neurology* (2000), pages 1280–1285.
[19] Letter, 22 Aug 00, Dr. Haley to Fred Juarbe (VFW), subject: Dr. Haley's research.
[20] Letter, 19 Sep 00, John Gwizdak (VFW) to Secretary Cohen, subject: Dr. Haley's research.
[21] Memorandum, 19 Mar 99, Dr. Haley to Dr. Adams, subject: Request for Retroactive Funding.
[22] Letter, 27 Aug 99, Dr. Thomas Garthwaite (VA) to H. Ross Perot, subject: Ways in which Dr. Haley could contact Gulf War veterans with ALS.
[23] AIBS Review Comments, Spring 1997, USAMRMC No. 97073003, Robert W. Haley, M.D., Proposal Title: Multi-Disciplinary Pathophysiologic Studies of Neurotoxic Gulf War-Related Syndromes Leading to Diagnosis and Treatment; and AIBS Second Review in Response to Dr. Haley's Rebuttal.
[24] Memorandum, 27 Jun 97, Department of Veteran's Affairs, Special Assistant to the Chief R&D Officer, subject: Review of Round #2 of BAA Proposals for Final Funding Recommendation.
[25] Email, 21 Jul 97, LTC Friedl, USAMRMC, to MAJ Seymour, Office of Congressional Liaison, subject: Haley.
[26] USAMRMC Cooperative Agreement with The University of Texas Southwestern Medical Center at Dallas, 30 Sep 97, Award No. DAMD17–97–2–7025.
[27] First Annual Progress Report on Agreement No. DAMD17–97–2–7025, dated October 1998, for the period 30 Sep 97–29 Sep 98, submitted to USAMRMC by Dr. Haley, University of Texas.
[28] Letter, 19 Feb 99, LTC Friedl to Dr. Haley, subject: Request for Revisions to Annual Report Based on AIBS Review Comments (AIBS Comments Enclosed).
[29] Letter, 19 Mar 00, Dr. Haley and Dr. Adams to LTC Friedl, subject: Human use approval.
[30] Modification P90002, dated 1 Apr 99, to USAMRMC Cooperative Agreement with The University of Texas Southwestern Medical Center at Dallas, 30 Sep 97, Award No. DAMD17–97–2–7025, subject: No-cost 18-month extension of performance period; and letter, 12 Feb 99, The University of Texas Southwestern Medical Center at Dallas, subject: Request for No-Cost Extension.
[31] Second Annual Progress Report on Agreement No. DAMD17–97–2–7025, dated September 1999, for the period 30 Sep 98–30 Sep 99, submitted to USAMRMC by Dr. Haley, University of Texas.
[32] Letter, 10 Aug 00, LTC Friedl to Dr. Haley, subject: Request for a Final Report Based on AIBS Review Comments of the Second Annual Progress Report (AIBS Comments Enclosed).
[33] United States Senate Committee on Veterans Affairs, *Report of the Special Investigation Unit on Gulf War Illnesses* (1998), page 160.
[34] Transcript of the 22 Jun 99 hearing of the Presidential Special Oversight Board on "Multi-Disciplinary Pathophysiologic Studies of Neurotoxic Gulf War-Related Syndromes Leading to Diagnosis and Treatment."
[35] Letter, 24 Jun 99, Dr. Jonathan Samet (Johns Hopkins) to Admiral Zumwalt (PSOB), subject: Dr. Haley's research.
[36] RAND Report, *A Review of the Scientific Literature as it Pertains to Gulf War Illnesses: Volume 4: Stress,* 1999.
[37] RAND Report, *A Review of the Scientific Literature as it Pertains to Gulf War Illnesses: Volume 4: Stress,* 2000.
[38] Testimony of The Honorable Charles Duelfer and Mr. Igor Mitrokhin (UNSCOM) to the Presidential Advisory Committee, 29–30 Jul 97.
[39] Testimony of Mr. Bob Walpole to the Presidential Special Oversight Board, 13 Jul 99.
[40] Presidential Special Oversight Board on Gulf War Veteran's Illnesses, Special Report, 1999.
[41] United States Senate Committee on Veterans Affairs, *Report of the Special Investigation Unit on Gulf War Illnesses* (1998), page 44.
[42] Letter, 25 Sep 00, Mr. Michael Naylon (PSOB) to Secretary Cohen, subject: VFW 19 Sep 00 letter to the Secretary.
[43] Letter, 29 Apr 99, Dr. Haley to CAPT Michael Kilpatrick (OSAGWI), subject: Letters to veterans with ALS.
[44] ALS Letters Conference Call Notes, 8 Jun 99.

Senator SPECTER. We give you no assurances as to how many people will read it. Tell us.

Dr. ROSTKER. That is fine. We have been, frankly, over the last 3 years very disappointed and frustrated. After going out against——

Senator SPECTER. No, no. Do not read a statement. I want to know——

Dr. ROSTKER. Sir, 3 years ago, I——

Senator SPECTER. I want to know what you think of Dr. Haley's conclusions.

Dr. ROSTKER. Right. Three years ago, I went out personally, based on Dr. Haley's conclusions, and overrode the scientific community and provided Dr. Haley with $3 million worth of government research money to carry on his work. And I was lambasted by the scientific community. I was singled out in the President's Advisory Committee for——

Senator SPECTER. But you got promoted. What did you think of his work?

Dr. ROSTKER. Let me finish, please, sir.

Senator SPECTER. OK.

Dr. ROSTKER. OK? Part of what we funded was an extension of Dr. Haley's research proposal in terms of bringing in case controls and bringing in other people. And to date, Dr. Haley has failed to deliver on his cooperative agreement with the Government. Now, I think Dr. Haley's research is interesting, and I would encourage him to put it in the peer review process and let competent medical scientists review it against other research that is also competing for research funds.

We do not draw a conclusion on Dr. Haley's research. We are perfectly willing to support it. But we do not again want to see Dr. Haley lobbying in place of the peer review competitive research process.

Senator SPECTER. Dr. Rostker has made a comment about your not having fulfilled your commitment, Dr. Haley. You are entitled to a chance to respond to that.

Dr. HALEY. Sure. Well, first of all, I think the main answer is, we published 21 papers in peer review journals. And I think that speaks for itself. Second, we proposed—our proposal that went through peer review, we have been turned down five times. We have submitted five protocols to the peer review, and all five have been turned down. That research has ultimately been funded, and we published 21 papers from it in the top peer review journals.

Senator HUTCHISON. Do you mean privately funded?

Dr. HALEY. About half of that was privately funded by the Perot Foundation and about half of that was funded by the Office of the Secretary of Defense. And I think it was really Secretary Cohen, not Mr. Rostker, that funded that.

But what is really important here is, we submitted a proposal for $16 million after we published our three papers back to back in the Journal of the American Medical Association. Look, no other researchers, as far as I know, have ever published three papers back to back in the top medical journal.

We then immediately envisioned a research proposal that would take five different tracks, we got five different groups collaborating with us to go in parallel, to take different parts of it, to try to get within two or three to get to a resolution of this with a national survey, which I talked to you. We proposed this back in 1997. Animals studies to correlate with the human studies and treatment studies to see if we could start finding treatment, a $16 million proposal.

It went up. It was turned down. The Secretary of Defense then pulled it back out of the press, the mess, and called us up, went back over it. With Dr. Rostker's concurrence, they funded $3 million of that, not the $16 million. Well, they are trying to hold us accountable to the standard for the $16 million proposal and say we have not finished it.

The point is, we finished $3 million worth of that, which we negotiated with the project officers ahead of time. And he is not aware of that. We have completed that study. It was completed about three weeks ago was the final date. Twenty-one publications have come out totally from our work. And I think it speaks for itself. So I think what he is saying is completely off base and just an attempt to try to keep us out of the funding stream.

Dr. ROSTKER. Sir, just review the annual reports that Dr. Haley submitted that were reviewed independently by the American Institute of Biological Sciences. The cooperative agreement for $3 million had in it, and I quote, "to determine whether the findings of the study, number one, can be replicated in an independent population of Gulf war veterans."

That was part of the $3 million that Dr. Haley committed to. He has been told each year that the study annual reports were inadequate. And he is—we have expressed our concern that his efforts would not lead to a replication of the study material, as he committed to in the cooperative agreement.

Now putting all of that besides, Dr. Haley's proposal should be viewed on the merits. They should be viewed on the merits by a peer review process, a competitive process. And that is what we support.

I am not a physician. I take no view on Dr. Haley's medical competence one way or the other. But having gone around the peer review process, I am now convinced that the best way to move forward is through a competitive peer review process.

Senator SPECTER. Well, Dr. Rostker, what are you referring to as having gone around the peer review process any lobbying? Dr. Haley says he has gone through the peer review process.

Dr. ROSTKER. And, sir, the peer review process did not mark down Dr. Haley's results. When we funded Dr. Haley for $3 million, I went back and asked the committee to identify those components of Dr. Haley's proposal, which they rated had scientific merit. And then we took it away from the competitive portion, having now identified the area that the peer reviews had scientific merit, and we funded all of the scientific merit. That is how we got to the $3 million.

Senator SPECTER. Dr. Haley, did the peer review make findings? Is Dr. Rostker correct about that?

Dr. HALEY. Oh, I do not think that proposal was peer reviewed. We were contacted by the Office of Secretary of Defense above Dr. Rostker's office, invited to come up, present to the service chiefs and to the Secretary himself. And the Secretary put $3 million on the table there.

Dr. ROSTKER. Not correct, sir.

Dr. HALEY. Dr. Rostker was not even there.

Dr. ROSTKER. That is not correct. And by the way——

Senator SPECTER. What is correct, Dr. Rostker?

Dr. ROSTKER. What is correct is that Dr. Haley responded to a broad area announcement that was promulgated in 1995, promulgated by the U.S. Army Research and Medical Command. He asked for $12 million. The total amount that was available was $10 million. The American Institute of Biological Science, under contract to the Army, assembled a panel of independent, non-DOD scientists to peer review the scientific merit of the proposal submitted under 95–1 broad area announcement.

The panel assigned a low scientific merit score to Dr. Haley's proposal overall and recommended only specific portions of the proposal met scientific merit for funding. The working group of the Persian Gulf Veterans Coordinating Board, which is the competitive selection authority, recommended against Dr. Haley's proposal based on its low overall scientific score. And its cost exceeded the total funds available for the 95–1 solicitation.

Following intense lobbying by Dr. Haley, DOD agreed to make limited funds, $3 million, available to fund only those specific portions of his proposal that were deemed to be scientifically meritorious by the independent peer review panel.

Senator SPECTER. Dr. Sox, where do you suggest, after hearing this difference of opinion, to put it mildly, where do you suggest that the direction ought to be taken as to try to make a definitive answer. You testified that there were short-term effects from the toxics you referred to. Where do you suggest we ought to go at this point?

May the record show a grimace?

Dr. SOX. Well, our committee regarded Dr. Haley's findings as interesting observations that were worthy of further study and replication in larger populations by other investigators. And my personal opinion is that that is the direction that we should go, through a peer review mechanism. The peer review mechanism for deciding who is going to get research money and who does not has served this country very well. And I am in agreement with Dr. Rostker that that is the right way to go.

Mr. PEROT. May I say something?

Senator SPECTER. By all means. Mr. Perot, we were saving the best for last.

Mr. PEROT. I think you now clearly understand why this has gone on for 10 years and nothing has happened. It is this kind of talk right here. This is the captain of the stress team right here on my left.

And that is his whole strategy.

Dr. ROSTKER. Absolutely untrue. We looked at—I commissioned the Rand Corporation——

Mr. PEROT. Take it to court.

Dr. ROSTKER. Good. Let us do that.

We commissioned the Rand Corporation to do a whole series of reviews similar to what the IOM did, because those reviews were not available. One of the papers that Rand did was stress.

And what Rand said was there are no markers for stress, that you could not draw a conclusion about stress, but that did not mean it existed. And we have never stressed stress. We have looked at pyridostigmine bromine. We have looked at pesticides.

We have extensively looked, as you know, Mr. Chairman, at the use of chemicals on the battlefield.

In part of my statement is an exchange between me and Dr. Haley about the possibility of chemicals on the battlefield, in which Dr. Haley declared himself not to be an expert on chemicals on the battlefield. In fact, he said he hardly ever talked about it. And you heard today that he claims to have definitive proof of chemicals on the battlefield. He has turned the whole logic train upside down.

Senator SPECTER. Do you want to respond to that, Dr. Haley?

Dr. HALEY. Yes. That is strange, because I have not said anything about chemicals on the battlefield. What I have talked about is a genetic difference with a genetic enzyme whose only function in a toxicologic realm is protecting against nerve gas. In other words, there are different ways to skin a cat.

And that is, it may well be that we will never have evidence, we will never amass enough evidence, to know who was exposed to what. But maybe the answer is not in their exposure histories, but it may be in their stars, you know, in their genes. And we can look in this genetic mechanism. If this finding is replicated, I think it is an inescapable conclusion that nerve gas was probably related to this problem.

Senator SPECTER. Well, what I glean from what we have heard here today is that there is no real comprehensive, agreed-upon way to proceed. Dr. Rostker, you have the responsibility in the Department of Defense. The subcommittee would like you to give us your idea of a battle plan, to get a definitive answer and how you would go about it and how long it is going to take and what it is going to cost.

And in the interim, Dr. Haley, we would encourage you pursue your line of inquiry. You are buttressed by what Dr. Sox has to say about the initial work which you have done.

And, Dr. Sox, we would like you to look at the protocol. And before yielding to Senator Hutchison for the final, final word, Mr. Perot, what are your views at this point?

Mr. PEROT. Well, I think we ought to follow Churchill's words in World War II, action this day. We can talk about this forever. We can quibble about it forever. In the meantime, the men are suffering.

Now what if, when this enlisted man was tangled in the rope, Ensign Johnson had gone through this thought pattern? Well, the guy would have lost—you know, while he was thinking about it, the guy would have died. Now, men are dying all the time. We have wasted most of our time on this bureaucratic rambling that goes on.

There is, whether they want to admit it or not, a total bias to try to make this stress and keep everybody out of the arena that is trying to do anything except declare it stress. Stress, that just does not walk, even to a layman. You do not have to be an M.D. to figure out these patterns between the three of the wars and what have you. It does not fit. And a 100-hour war is not a giant stress producer.

More than anything else, we have to, in order to prepare and protect our people from the next war, we have to solve this problem. And as we solve the problem, one segment of it will be, how

do you treat people. And we should move forward in a very orderly way.

That is the reason I recommend, and I can summarize my recommendation, to turn it over to the National Institute of Health or CDC and have them run it.

Senator SPECTER. Senator Hutchison, the last word——

Mr. PEROT. That is their business. They know how to do it.

Senator SPECTER. Senator Hutchison, the last word.

Senator HUTCHISON. Well, thank you, Mr. Chairman, for calling this hearing. I think it has been very informative. I am always reminded of the two different kinds of lawyers. There are the kinds of lawyers that tell you all the ways you cannot do something, and there are the kinds of lawyers who take the most complicated problem and tell you what you can do legally.

I would like to see us tone down the rhetoric here. We have a few studies that seem to be definitive, the Rand study that says that really they did not find the stress-related causal connection. I think we should throw that out the window. So we have physical problems, and we now have a pretty good study that says it is not stress.

So I think we need to take the next step. We have Dr. Haley's study, which I think certainly is a nugget from which to go. I think, Dr. Rostker, you were very right and correct and brave to go against all the scientists who had come for 10 years with really nothing very definitive. And you said, OK, let us give this other approach a chance. You did that. And now I think you have something to hang onto. And let us do go—I believe that Dr. Haley would be very pleased to put his work to the test of other experts in the field.

And I hope that the conflict between the two of you will not keep you from working together, because I think we have something to build on, maybe for the first time. And we certainly do not have any definitive results from this great other body of work, other than that stress is not a cause. So I think we have the nugget to work. And if we—I think we all have the same goal. And it is the goal that was stated by Mr. Perot. We have the responsibility to protect the next group that we send into the field.

And if we could put the past behind us and say we have a nugget, let us take the next step to see where we go, and just hopefully we will be able to declare a Gulf war syndrome and focus on all the potential causal connections and the treatments and the protection in the future. And that is what I think all of us would like to do.

And I thank all of you for the contributions you have made to hopefully starting that process.

Senator SPECTER. Thank you very much, Captain Dyckman, Dr. Haley, Dr. Sox, Dr. Rostker.

CONCLUSION OF HEARING

Thank you all very much for being here. That concludes our hearing. The subcommittee will stand in recess subject to the call of the Chair.

[Whereupon, at 12:02 p.m., Thursday, October 12, the hearing was concluded, and the subcommittee was recessed, to reconvene subject to the call of the Chair.]

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