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OPERATION DESERT STORM

Potential for Reproductive Dysfunction Is Not Being Adequately Monitored

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Mr. Chairman and Members of the Committee:

We are here today to present our report on possible reproductive dysfunction among the U.S. armed forces who served in the Persian Gulf war. My oral statement is based upon the report we are issuing today, Operation Desert Storm: Questions Remain on Possible Exposure to Reproductive Toxicants. I ask that it and my prepared statement be included in the record of this hearing at the conclusion of my oral remarks.

Since their return from the war in the Persian Gulf, many veterans have complained of a variety of health problems including reports of an increased number of birth defects and other reproductive problems. It is now known that before, during, and after the war, U.S. troops were exposed to a very wide variety of potentially hazardous substances. These include but are not limited to the following: diesel fuel used as a dust suppressant at encampments, smoke from the burning of human and other waste with fuel oil, shower water contaminated with fuel, investigational drugs and vaccines to protect against chemical and biological weapons, pesticides and insect repellents, and the smoke from the oil-well fires at the end of the war.

My testimony today, and our report, is focused on the potential for reproductive effects from these and other substances. The work we did was in response to questions the Chairman posed to us this past January. I summarize those questions and our responses as follows.

ASSESSMENTS OF REPRODUCTIVE TOXICANTS BEFORE THE WAR

First, What assessments were performed before the gulf war to determine the potential for exposure to reproductive toxicants? We found that the assessment process that the Department of Defense (DOD) uses for reproductive toxicants was incomplete. During DOD's material acquisition process for equipment, it performs general health hazard assessments that may identify reproductive toxicants, and it relied on the Environmental Protection Agency's normal processes for screening pesticides used in the gulf war. However, not included in DOD's assessments were potential reproductive effects from various individual compounds present in the working environment of deployed troops and from the possible synergistic effects of exposure to combinations of hazards. These potential effects are currently unknown.

REPRODUCTIVE TOXICANTS PRESENT DURING THE WAR

Second, What reproductive toxicants, if any, did DOD actually identify? We found that the DOD's health hazard assessment process generally endeavors to identify potential reproductive toxicants that are internal to the weapon system

development process. However, in addition, we found several reproductive toxicants that were external to that process and that were not identified by DOD. These included reproductive toxicants from the oil-well fires.

We found a total of 21 reproductive toxicants (listed in appendix I at the end of my statement). All these substances were, of course, known to be present in the gulf region, and prior scientific research had identified them as potential reproductive toxicants. However, up to this point, it has not been pointed out that these specific substances present in the gulf region are known reproductive toxicants and that an unknown but potentially large number of U.S. troops were exposed to them.

However, we did not ascertain cause-and-effect relationships between exposure to these 21 toxicants and reproductive dysfunction reported by veterans of the war. Also, the concentration levels of these compounds are unknown and so are the exposure rates for specific units.

EDUCATION AND PROTECTION AFFORDED TROOPS DURING THE WAR

Third, What protection and education were provided to military personnel to avoid reproductive toxicants during the war? We found none directed specifically at reproductive toxicants. However, some activities covered by DOD directives to protect against other hazards may have also minimized exposure to the reproductive toxicants present. Yet, as we reported earlier, some of the protective facilities, equipment, and training were not adequate.[1]

DOD did provide some guidance to troops on the toxic hazards of the oil-well fires. However, because these fires were unanticipated and widespread, it was not possible to adequately protect service members from them. This is important because we found that several substances in the oil-well fires are known reproductive toxicants.

MONITORING FOR REPRODUCTIVE DYSFUNCTION AFTER THE WAR

Fourth, How are veterans now being monitored for reproductive dysfunction? On this point, we found several major shortcomings involving certain ongoing and planned studies as well as the Veterans Affairs (VA) and DOD registries.

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[1]U.S. General Accounting Office, Operation Desert Storm: Army Not Adequately Prepared to Deal With Depleted Uranium Contamination, GAO/NSIAD-93-90 (Washington, D.C.: January 1993), and U.S. General Accounting Office, Chemical Warfare: Soldiers Inadequately Equipped and Trained to Conduct Chemical Operations, GAO/NSIAD-91-197 (Washington, D.C.: May 1991).

To begin with, monitoring has not addressed all forms of reproductive dysfunction. For example, the VA registry examinations did question veterans about birth defects and whether women were pregnant while in the gulf, but the registry did not cover other issues such as infertility, miscarriage, and additional possible forms of reproductive dysfunction.

The VA has recently decided to revise its registry questionnaire to include questions on infertility and miscarriage. However, the VA has not decided whether the 20,000 veterans who have already responded to the earlier, less complete, questionnaire will be queried. If they are not, it is possible that data will not be collected from the very veterans who are most likely to have had adverse reproductive health effects.

Also, a study conducted jointly by the VA, the Centers for Disease Control and Prevention (CDC), and the Mississippi State Department of Health assessed a high rate of birth defects reported by reserve units in Mississippi. As described to us, this unfinished study concludes to date that there was not an abnormally high incidence of birth defects among this group compared to a group consisting of the overall population of the Atlanta metropolitan area and similar data from California and Iowa.

One of our concerns regarding this study is the possible lack of comparability between a group of military reservists and the population of urban areas such as Atlanta. While the CDC data constitute a standard set accepted among experts, it is reasonable to question whether the Mississippi reservists might have been a healthier set of individuals than the general population found in urban areas such as Atlanta. In this case, the Mississippi reservists would be expected to have a lower rate of birth defects than the rate predicted from the Atlanta comparison base rather than an equivalent rate. A second concern is that the small size of the Mississippi group makes it difficult to detect differences in rates of birth defects unless they are of fairly large magnitude.

Finally, a study to be conducted by the Navy Medical Research Center in San Diego, California, plans to examine differences in birth outcomes between a large number of gulf veterans and a large comparison group of military personnel who were not deployed to the gulf. However, this study will not examine records from reserve components and will not collect data on infertility and miscarriage rates.

In summary, questions remain unanswered concerning the potential reproductive and developmental dysfunction that may have occurred as a result of the Persian Gulf war. The basis for this uncertainty is threefold: (1) certain potential reproductive

toxicants were indeed present in the region during the deployment of U.S. troops; (2) in the case of some of these toxicants, the exposures may have been widespread but were of unknown intensity; and (3) the studies that have been performed to date are unfinished, cannot be generalized, or are too weak methodologically to demonstrate convincingly that there are or are not abnormally high reproductive dysfunction rates among Persian Gulf veterans and their families.

RECOMMENDATIONS

Based on our work, we have four recommendations.

First, the Secretary of Veterans Affairs should direct that the VA use its revised and expanded questionnaire to reregister the 20,000 veterans who have already had a VA registry examination.

Second, the Secretary of Defense, working in concert with the Environmental Protection Agency and the Department of Health and Human Services, should ensure that DOD makes additional scientific inquiry into the possible synergistic effects of multiple exposures to hazards found in the Persian Gulf.

Third, the Secretary of Defense should explore approaches to collecting baseline data on birth outcomes, infertility, and miscarriage rates among active duty and reserve military personnel so that these data are available for future studies. This information should also include baseline data on exposure levels to ascertain when exposures of reproductive toxicants rise to dangerous levels in future conflicts.

Fourth, DOD should develop procedures to better ensure that troops are informed of possible reproductive toxicants before future deployments and to monitor exposure levels to such hazards.

That concludes my testimony, Mr. Chairman; I will be happy to answer any questions you or the members of the Committee may have.

Appendix I

This appendix lists potential reproductive and developmental toxicants GAO found to be present in the Persian Gulf area of U.S. armed forces deployment during Operations Desert Shield and Desert Storm. Paternal reproductive dysfunction is indicated by tests to determine links to reductions in male reproductive capacity, including tests on semen, the endocrine system, fertility rates, weight of accessory sex glands, and testes. Maternal reproductive dysfunction is indicated by tests on ovaries, the hypothalamus and pituitary, the endocrine system, oviducts, uterus, cervix, vulva and vagina, and fertility rates. Events that adversely affect the pre- and postnatal development of a child are known as developmental, while embryofetal toxicity includes effects on survival and development of the embryo or fetus, as well as minor malformations and reversible abnormalities. (These are also noted as malformations.) The terms given correspond to the scientific literature on which the information is based.

Pesticides

- Carbaryl, paternal and maternal, malformations
- Diazinon, malformations
- Dichlorvos, paternal and maternal, malformations
- Ethanol, paternal
- Lindane, paternal and maternal
- Warfarin, developmental

Oil Fires and Soil Samples

- Arsenic, paternal and maternal, developmental
- Benzene, paternal and maternal
- Benzo (a) pyrene, paternal and maternal
- Cadmium, paternal, developmental
- Di-n-butyl phthalate, paternal
- Hexachlorobenzene, developmental
- Hexachlorocyclopentadiene, embryofetal
- Hexachloroethane, embryofetal
- Lead, paternal and maternal, developmental
- Mercury, paternal and maternal, developmental
- Nickel, paternal and maternal
- Pentachlorophenol, embryofetal
- Toluene, paternal and maternal, developmental
- Xylene, paternal and maternal

Decontaminating Agents

- Ethylene glycol monomethyl ether, paternal and maternal

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