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DEFENSE HEALTH CARE

Occupational and Environmental Health Surveillance Conducted during Deployments Needs Improvement

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July 19, 2005

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Highlights

Highlights of GAO-05-903T, a testimony before the Subcommittee on National Security, Emerging Threats, and International Relations, Committee on Government Reform, House of Representatives

Why GAO Did This Study

Following the 1991 Persian Gulf War, research and investigations into the causes of servicemembers' unexplained illnesses were hampered by a lack of servicemember health and deployment data, including inadequate occupational and environmental exposure data. In 1997, the Department of Defense (DOD) developed a militarywide health surveillance framework that includes occupational and environmental health surveillance (OEHS)—the regular collection and reporting of occupational and environmental health hazard data by the military services.

This testimony is based on GAO's report, entitled *Defense Health Care: Improvements Needed in Occupational and Environmental Health Surveillance during Deployment to Address Immediate and Long-term Health Issues* (GAO-05-632). The testimony presents findings about how the deployed military services have implemented DOD's policies for collecting and reporting OEHS data for Operation Iraqi Freedom (OIF) and the efforts under way to use OEHS reports to address both immediate and long-term health issues of servicemembers deployed in support of OIF.

www.gao.gov/cgi-bin/getrpt?GAO-05-903T.

To view the full product, including the scope and methodology, click on the link above. For more information, contact Marcia Crosse at (202) 512-7119 or crossem@gao.gov.

What GAO Found

Although OEHS data generally have been collected and reported for OIF, as required by DOD policy, the deployed military services have used different data collection methods and have not submitted all of the OEHS reports that have been completed. Data collection methods for air and soil surveillance have varied across the services, for example, although they have been using the same monitoring standard for water surveillance. For some OEHS activities, a cross-service working group has been developing standards and practices to increase uniformity of data collection among the services. In addition, while the deployed military services have been conducting OEHS activities, they have not submitted all of the OEHS reports that have been completed during OIF. Moreover, DOD officials could not identify the reports they had not received to determine the extent of noncompliance.

DOD has made progress in using OEHS reports to address immediate health risks during OIF, but limitations remain in employing these reports to address both immediate and long-term health issues. OEHS reports have been used consistently during OIF as part of operational risk management activities intended to identify and address immediate health risks and to make servicemembers aware of the risks of potential exposures. While these efforts may help in reducing health risks, DOD has not systematically evaluated their implementation during OIF. DOD's centralized archive of OEHS reports for OIF has several limitations for addressing potential long-term health effects related to occupational and environmental exposures. First, access to the centralized archive has been limited due to the security classification of most OEHS reports. Second, it will be difficult to link most OEHS reports to individual servicemembers' records because not all data on servicemembers' deployment locations have been submitted to DOD's centralized tracking database. To address problems with linking OEHS reports to individual servicemembers, the deployed military services have tried to include OEHS monitoring summaries in the medical records of some servicemembers for either specific incidents of potential exposure or for specific locations within OIF. Additionally, according to DOD and Veterans Affairs (VA) officials, no federal research plan has been developed to evaluate the long-term health of servicemembers deployed in support of OIF, including the effects of potential exposures to occupational or environmental hazards.

GAO's report made several recommendations, including that the Secretary of Defense improve deployment OEHS data collection and reporting and evaluate OEHS risk management activities and that the Secretaries of Defense and Veterans Affairs jointly develop a federal research plan to address long-term health effects of OIF deployment. DOD plans to take steps to meet the intent of our first recommendation and partially concurred with the other recommendations. VA concurred with our recommendation for a joint federal research plan.

Mr. Chairman and Members of the Subcommittee:

I am pleased to be here today as you consider the efforts by the deployed military services to implement policies for collecting and reporting occupational and environmental health surveillance data for Operation Iraqi Freedom (OIF) and the work under way to use these data to address both the immediate and long-term health issues of servicemembers deployed in support of OIF. The health effects from service in military operations have been of increasing interest since the end of the 1991 Persian Gulf War—an interest that was renewed when servicemembers were deployed in early 2003 to the Persian Gulf in support of OIF. Following the 1991 Gulf War, many servicemembers reported suffering from unexplained illnesses that they attributed to their service in the Persian Gulf and expressed concerns about possible exposures to chemical or biological warfare agents or environmental contaminants. Subsequent research and investigations into the nature and causes of these illnesses by the Department of Defense (DOD), the Department of Veterans Affairs (VA), the Department of Health and Human Services (HHS), the Institute of Medicine, and a Presidential Advisory Committee were hampered by a lack of servicemember health and deployment data, including inadequate occupational and environmental exposure data.

To address continuing concerns about the health of servicemembers during and after deployments and to improve health data collection on potential exposures, DOD developed a militarywide health surveillance framework for use during deployments beginning in 1997. A key component of this framework is occupational and environmental health surveillance (OEHS), an activity that includes the regular collection and reporting of occupational and environmental health hazard data by the military services during a deployment that can be used to monitor the health of servicemembers and to prevent, treat, or control disease or injury. DOD has created policies for OEHS data collection during a deployment and for the submittal of OEHS reports to a centralized archive within specified time frames. The military services are responsible for implementing these policies in preparation for deployments. During a deployment, the military services are unified under a deployment command structure and are responsible for conducting OEHS activities in accordance with DOD policy. Throughout this testimony, we identify the military services operating in a deployment as “deployed military services.”

My remarks will summarize our findings on (1) how the deployed military services have implemented DOD's policies for collecting and reporting OEHS data for OIF and (2) the efforts under way to use OEHS reports to address both the immediate and long-term health issues of servicemembers deployed in support of OIF. My statement is based on our report, entitled *Defense Health Care: Improvements Needed in Occupational and Environmental Health Surveillance during Deployments to Address Immediate and Long-term Health Issues* (GAO-05-632), which is being released today.

To do this work, we reviewed pertinent policies, guidance, and reports related to collecting and reporting OEHS data obtained from officials at the Deployment Health Support Directorate (DHSD), the military services, and the Joint Staff, which supports the Chairman of the Joint Chiefs of Staff.[1] We also conducted site visits to the Army, Navy, and Air Force health surveillance centers that develop standards and guidance for conducting OEHS.[2] We interviewed DOD officials and reviewed reports and documents identifying occupational and environmental health risks and outlining recommendations for addressing risks at deployment sites. We interviewed officials at the U.S. Army's Center for Health Promotion and Preventive Medicine (CHPPM), which archives OEHS reports, both classified and unclassified, for all the military services. We also interviewed officials and military service representatives at DOD's Deployment Manpower Data Center on the status of a centralized deployment tracking database to identify deployed servicemembers and record their locations within the theater of operations. Additionally, we interviewed VA officials on their experience in obtaining and using OEHS reports from OIF to address the health care needs of veterans. Finally, we interviewed DOD and VA officials to examine whether the agencies have planned or initiated health research to evaluate the long-term health of servicemembers deployed in support of OIF using OEHS reports. We conducted our work from September 2004 through June 2005 in accordance with generally accepted government auditing standards.

In summary, although OEHS data generally have been collected and reported for OIF, as required by DOD policy, the deployed military services have used different data collection methods and have not

[1]The Chairman of the Joint Chiefs of Staff is the principal military adviser to the President, the National Security Council, and the Secretary of Defense.

[2]The Navy supports OEHS activities for the Marine Corps.

submitted all of the OEHS reports that have been completed. Data collection methods for air and soil surveillance have varied across the services, for example, although they have been using the same monitoring standard for water surveillance. Compounding these differences among the services were varying levels of training and expertise among the deployed military service personnel who were responsible for conducting OEHS activities, resulting in differing practices for implementing data collection standards. For some OEHS activities, a cross-service working group, called the Joint Environmental Surveillance Working Group, has been developing standards and practices to increase uniformity of data collection among the services. In addition, the deployed military services have not submitted to CHPPM all OEHS reports that have been completed during OIF, as required by DOD policy. While 239 of the 277 OIF bases had at least one OEHS report submitted to CHPPM's centralized archive as of December 2004, CHPPM could not measure the magnitude of noncompliance because not all of the required consolidated lists that identify all OEHS reports completed during each quarter in OIF had been submitted. Therefore, CHPPM could not compare the reports that it had received against the list of reports that had been completed. According to CHPPM officials, obstacles to the services' reporting compliance may have included a lack of understanding by some within the deployed military services about the type of OEHS reports that should have been submitted. In addition, OEHS report submission may be given a lower priority compared to other deployment mission activities. Also, while CHPPM is responsible for OEHS archiving, it has no authority to enforce report submission requirements. To improve OEHS reporting compliance, DOD officials said they were revising an existing policy to add additional and more specific OEHS requirements.

DOD has made progress using OEHS reports to address immediate health risks during OIF, but limitations remain in employing these reports to address both immediate and long-term health issues. OIF is the first major deployment in which OEHS reports have been used consistently as part of operational risk management activities intended to identify and address immediate health risks. These activities included health risk assessments that described and measured the potential hazards at a site, risk mitigation activities intended to reduce potential exposure, and risk communication efforts undertaken to make servicemembers aware of the possible health risks of potential exposures. While these efforts may help reduce health risks, there is no assurance that they have been effective because DOD has not systematically evaluated the implementation of OEHS risk management activities in OIF. Despite progress in the use of OEHS information to identify and address immediate health risks, CHPPM's

centralized archive of OEHS reports for OIF has limitations for addressing potential long-term health effects related to occupational and environmental exposures for several reasons. First, access to CHPPM's OEHS archive has been limited because most OEHS reports are classified—which restricts their use by VA, medical professionals, and interested researchers. Second, it will be difficult to link most OEHS reports to individual servicemembers because not all data on servicemembers' deployment locations have been submitted to DOD's centralized tracking database. For example, none of the military services submitted location data for the first several months of OIF. To address problems with linking OEHS reports to individual servicemembers, the deployed military services have made efforts to include OEHS summaries in the medical records of some servicemembers for either specific incidents of potential exposure or for specific locations within OIF, such as air bases. Additionally, according to DOD and VA officials, no comprehensive federal research plan incorporating the use of the archived OEHS reports has been developed to address the long-term health consequences of service in OIF.

In the report we are issuing today, we recommend that the Secretary of Defense ensure that cross-service guidance is developed to implement DOD's revised policy for OEHS during deployments and ensure that the military services jointly establish and implement procedures to evaluate the effectiveness of risk management strategies during deployments. We also recommend that the Secretary of Defense and the Secretary of Veterans Affairs work together to develop a federal research plan to follow the health of OIF servicemembers over time that would include the use of OEHS reports. In commenting on a draft of this report, DOD stated that cross-service guidance meeting the intent of our recommendation would be developed by the Joint Staff instead of the military services. DOD partially concurred with our other recommendations. VA concurred with our recommendation to work with DOD to jointly develop a federal research plan to follow the long-term health of OIF servicemembers.

Background

As of the end of February 2005, an estimated 827,277 servicemembers had been deployed in support of OIF. Deployed servicemembers, such as those in OIF, are potentially subject to occupational and environmental hazards that can include exposure to harmful levels of environmental contaminants such as industrial toxic chemicals, chemical and biological

warfare agents, and radiological and nuclear contaminants. Harmful levels include high-level exposures that result in immediate health effects.[3] Health hazards may also include low-level exposures that could result in delayed or long-term health effects. Occupational and environmental health hazards may include such things as contamination from the past use of a site, from battle damage, from stored stockpiles, from military use of hazardous materials, or from other sources.

Federal OEHS Policy

As a result of numerous investigations that found inadequate data on deployment occupational and environmental exposure to identify the potential causes of unexplained illnesses among veterans who served in the 1991 Persian Gulf War, the federal government increased efforts to identify potential occupational and environmental hazards during deployments. In 1997, a Presidential Review Directive called for a report by the National Science and Technology Council to establish an interagency plan to improve the federal response to the health needs of veterans and their families related to the adverse effects of deployment.[4] The Council published a report that set a goal for the federal government to develop the capability to collect and assess data associated with anticipated exposure during deployments. Additionally, the report called for the maintenance of the capability to identify and link exposure and health data by Social Security number and unit identification code. Also in 1997, Public Law 105-85 included a provision recommending that DOD ensure the deployment of specialized units to theaters of operations to detect and monitor chemical, biological, and similar hazards.[5] The Presidential Review Directive and the public law led to a number of DOD instructions, directives, and memoranda that have guided the collection and reporting of deployment OEHS data.

[3]Harmful levels of environmental contaminants are determined by the concentration of the substance and the duration of exposure.

[4]Presidential Review Directive/National Science and Technology Council – 5 (April 21, 1997). The National Science and Technology Council is a cabinet-level council that helps coordinate federal science, space, and technology research and development for the president.

[5]National Defense Authorization Act for Fiscal Year 1998. Pub. L. No. 105-85, §768, 111 Stat. 1629, 1828 (1997) ("Sense of Congress").

DOD Entities Involved with Setting and Implementing OEHS Policy

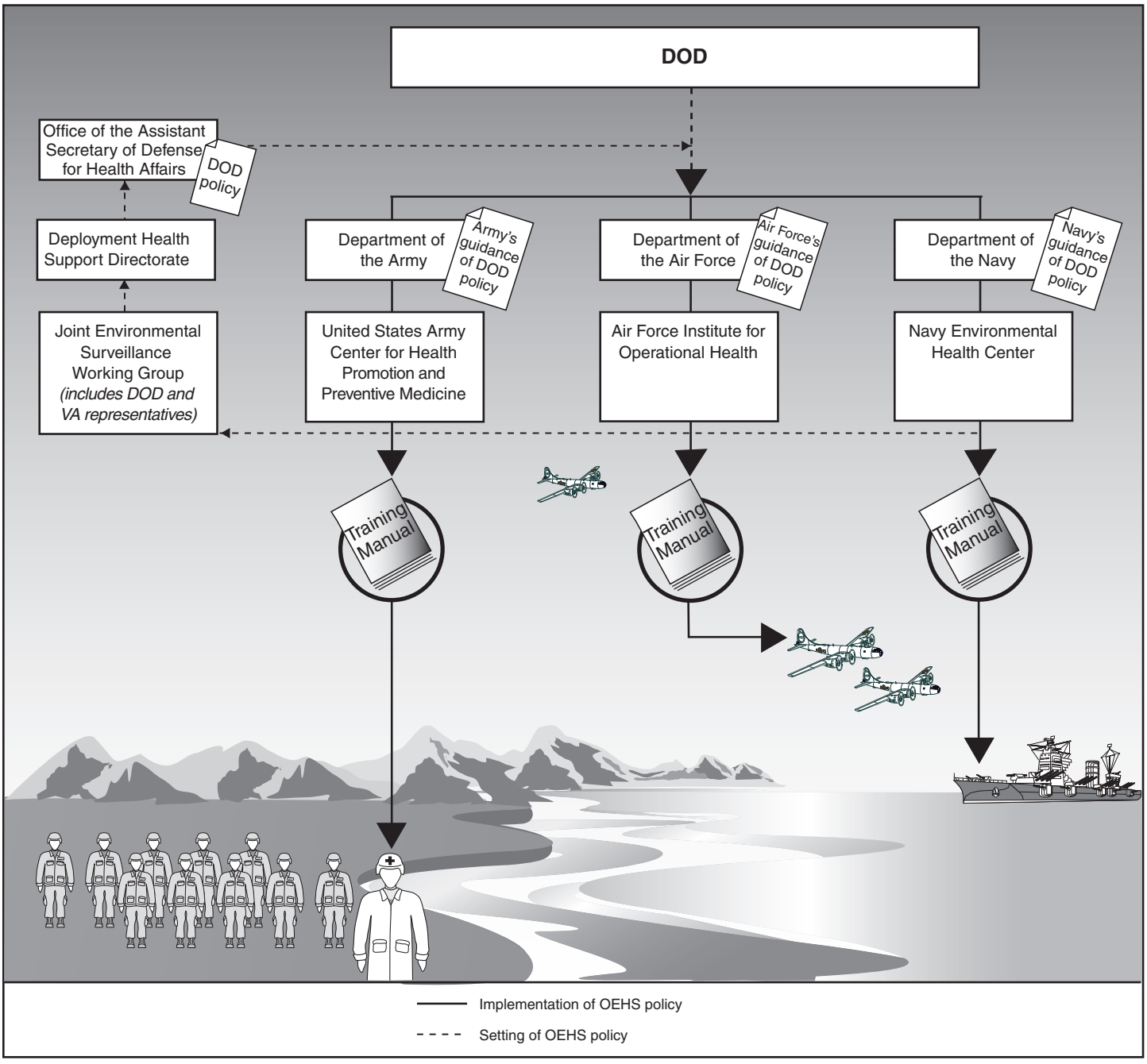
DHSD makes recommendations for DOD-wide policies on OEHS data collection and reporting during deployments to the Office of the Assistant Secretary of Defense for Health Affairs. DHSD is assisted by the Joint Environmental Surveillance Working Group, established in 1997, which serves as a coordinating body to develop and make recommendations for DOD-wide OEHS policy.[6] The working group includes representatives from the Army, Navy, and Air Force OEHS health surveillance centers, the Joint Staff, other DOD entities, and VA.

Each service has a health surveillance center—the CHPPM, the Navy Environmental Health Center, and the Air Force Institute for Operational Health—that provides training, technical guidance and assistance, analytical support, and support for preventive medicine units[7] in the theater in order to carry out deployment OEHS activities in accordance with DOD policy. In addition, these centers have developed and adapted military exposure guidelines for deployment using existing national standards for human health exposure limits and technical monitoring procedures (e.g., standards developed by the U.S. Environmental Protection Agency and the National Institute for Occupational Safety and Health) and have worked with other agencies to develop new guidelines when none existed. (See fig. 1.)

[6]The working group makes recommendations for deployment OEHS policy to the Deputy Assistant Secretary of Defense for Force Health Protection and Readiness, who serves as the director of DHSD.

[7]Each military service has preventive medicine units, though they may be named differently. Throughout this report, we use the term preventive medicine unit to apply to the units fielded by all military services.

Figure 1: Entities Involved in Setting or Implementing Occupational and Environmental Health Surveillance (OEHS) Policy



Source: DOD policies, Deployment Health Support Directorate, U.S. Army Center for Health Promotion and Preventive Medicine, Navy Environmental Health Center, Air Force Institute for Operational Health, and Art Explosion.

Deployment OEHS Reports

DOD policies and military service guidelines require that the preventive medicine units of each military service be responsible for collecting and reporting deployment OEHS data.[8] Deployment OEHS data are generally categorized into three types of reports: baseline, routine, or incident-driven.

- Baseline reports generally include site surveys and assessments of occupational and environmental hazards prior to deployment of servicemembers and initial environmental health site assessments once servicemembers are deployed.[9]

- Routine reports record the results of regular monitoring of air, water, and soil, and of monitoring for known or possible hazards identified in the baseline assessment.

- Incident-driven reports document exposure or outbreak investigations.[10]

There are no DOD-wide requirements on the specific number or type of OEHS reports that must be created for each deployment location because reports generated for each location reflect the specific occupational and environmental circumstances unique to that location. CHPPM officials said that reports generally reflect deployment OEHS activities that are limited to established sites such as base camps or forward operating bases;[11] an exception is an investigation during an incident outside these locations. Constraints to conducting OEHS outside of bases include risks to servicemembers encountered in combat and limits on the portability of OEHS equipment. In addition, DHSD officials said that preventive medicine units might not be aware of every potential health hazard and therefore might be unable to conduct appropriate OEHS activities.

[8]While in the deployment location, preventive medicine units create and store reports both electronically and on paper.

[9]Some bases can have more than one baseline report.

[10]DOD officials said the analysis of servicemembers' responses to a post-deployment health assessment questionnaire is another means to identify potential exposures that should be investigated. These assessments, designed to identify health issues or concerns that may require medical attention, use a questionnaire that is to be completed in theater and asks servicemembers if they believe they have been exposed to a hazardous agent.

[11]Throughout the testimony we refer to both base camps and forward operating bases collectively as bases. A forward operating base is usually smaller than a base camp in troop strength and infrastructure and is normally constructed for short-duration occupation.

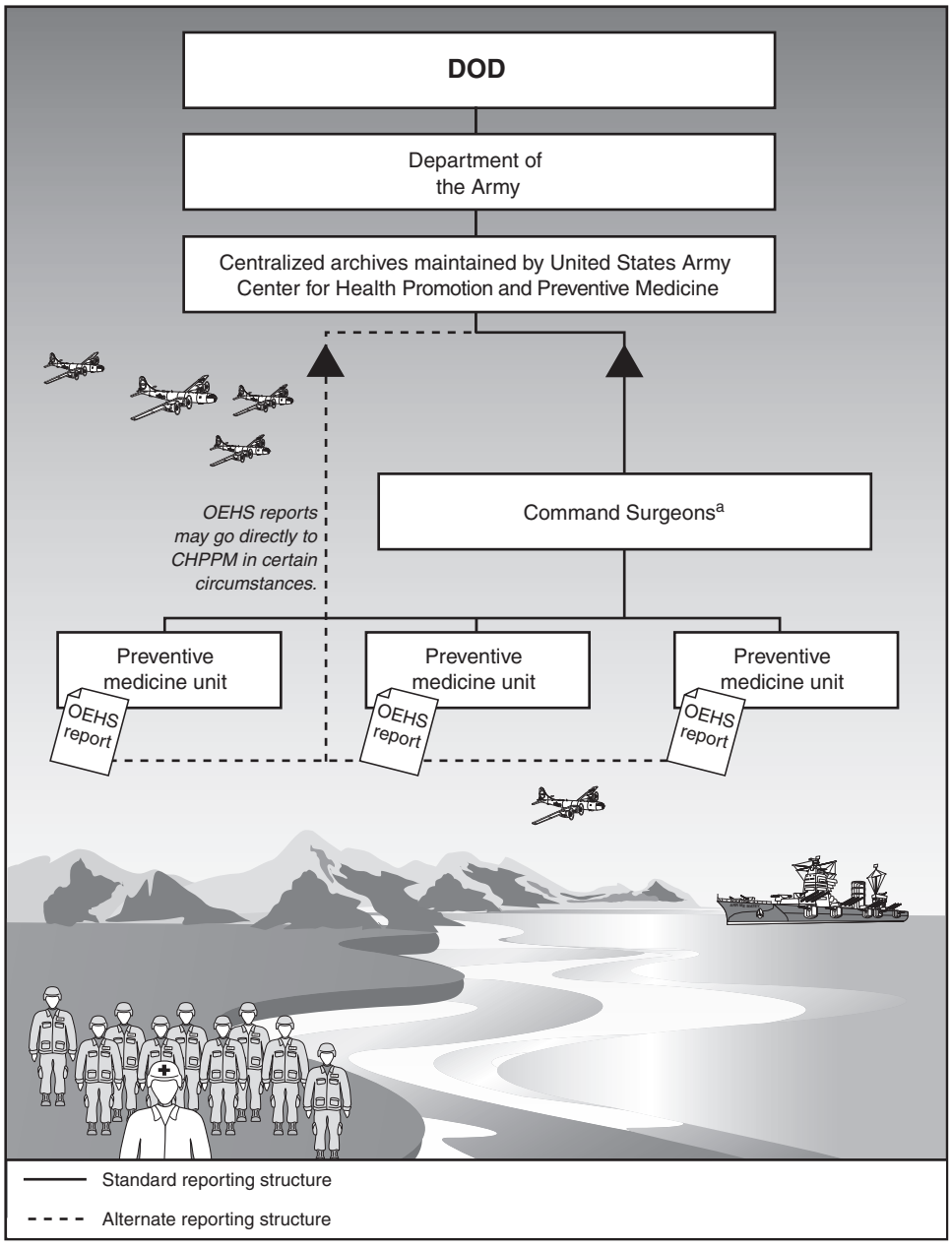
OEHS Reporting and Archiving Activities during Deployment

According to DOD policy, various entities must submit their completed OEHS reports to CHPPM during a deployment. The deployed military services have preventive medicine units that submit OEHS reports to their command surgeons,[12] who review all reports and ensure that they are sent to a centralized archive that is maintained by CHPPM.[13] Alternatively, preventive medicine units can be authorized to submit OEHS reports directly to CHPPM for archiving. (See fig. 2.)

[12]The command surgeons of deployed preventive medicine units are either Joint Task Force command surgeons or military service component command surgeons. In OIF, there are two Joint Task Forces, each with a command surgeon. In addition, the Army, Navy, Air Force, and Marine Corps have their own subordinate component commands in a deployment, each with a command surgeon.

[13]DOD has designated CHPPM as the entity responsible for archiving all OEHS reports from deployments.

Figure 2: Submittal of Deployment Occupational and Environmental Health Surveillance (OEHS) Reports to the Centralized Archive



Source: DOD and Art Explosion.

[a]The command surgeons of deployed preventive medicine units are either Joint Task Force command surgeons or military service component command surgeons. In OIF, there are two Joint Task Forces, each with a command surgeon. In addition, the Army, Navy, Air Force, and Marine Corps have their own subordinate component commands in a deployment, each with a command surgeon.

According to DOD policy, baseline and routine reports should be submitted within 30 days of report completion.[14] Initial incident-driven reports should be submitted within 7 days of an incident or outbreak. Interim and final reports for an incident should be submitted within 7 days of report completion. In addition, the preventive medicine units are required to provide quarterly lists of all completed deployment OEHS reports to the command surgeons. The command surgeons review these lists, merge them, and send CHPPM a quarterly consolidated list of all the deployment OEHS reports it should have received.

To assess the completeness of its centralized OEHS archive, CHPPM develops a quarterly summary report that identifies the number of baseline, routine, and incident-driven reports that have been submitted for all bases in a command. This report also summarizes the status of OEHS report[15] submissions by comparing the reports CHPPM receives with the quarterly consolidated lists from the command surgeons that list each of the OEHS reports that have been completed. For OIF, CHPPM is required to provide a quarterly summary report to the commander of U.S. Central Command[16] on the deployed military services' compliance with deployment OEHS reporting requirements.

Uses of Deployment OEHS Reports

During deployments, military commanders can use deployment OEHS reports completed and maintained by preventive medicine units to identify occupational and environmental health hazards[17] and to help guide their risk management decision making. Commanders use an operational risk management process to estimate health risks based on both the severity of the risks to servicemembers and the likelihood of encountering the specific hazard. Commanders balance the risk to servicemembers of encountering occupational and environmental health hazards while deployed, even following mitigation efforts, against the need to

[14]DOD policy does not prescribe a time frame for how long preventive medicine units have to complete a report.

[15]CHPPM also receives some deployment OEHS data that have not been incorporated into a report, such as tables of water sampling measurements.

[16]The U.S. Central Command is the combatant command responsible for all OIF operations.

[17]Along with deployment OEHS reports, commanders also examine medical intelligence, operational data, and medical surveillance (such as reports of servicemembers seen by medical units for injury or illness) to identify occupational and environmental health hazards.

accomplish specific mission requirements. The operational risk management process, which varies slightly across the services, includes

- risk assessment, including hazard identification, to describe and measure the potential hazards at a location;
- risk control and mitigation activities intended to reduce potential exposures; and
- risk communication efforts to make servicemembers aware of possible exposures, any risks to health that they may pose, the countermeasures to be employed to mitigate exposure or disease outcome, and any necessary medical measures or follow-up required during or after the deployment.

Along with health encounter[18] and servicemember location data, archived deployment OEHS reports are needed by researchers to conduct epidemiologic studies on the long-term health issues of deployed servicemembers. These data are needed, for example, by VA, which in 2002 expanded the scope of its health research to include research on the potential long-term health effects on servicemembers in hazardous military deployments. In a letter to the Secretary of Defense in 2003, VA said it was important for DOD to collect adequate health and exposure data from deployed servicemembers to ensure VA's ability to provide veterans' health care and disability compensation. VA noted in the letter that much of the controversy over the health problems of veterans who fought in the 1991 Persian Gulf War could have been avoided had more extensive surveillance data been collected. VA asked in the letter that it be allowed access to any unclassified data collected during deployments on the possible exposure of servicemembers to environmental hazards of all kinds.

[18]Examples of health encounter data are medical records of in-patient and out-patient care, health assessments completed by servicemembers before and after a deployment, and blood serum samples.

Deployed Military Services Use Varying Approaches to Collect OEHS Data and Have Not Submitted All OEHS Reports for OIF

The deployed military services generally have collected and reported OEHS data for OIF, as required by DOD policy. However, the deployed military services have used different OEHS data collection standards and practices, because each service has its own authority to implement broad DOD policies. To increase data collection uniformity, the Joint Environmental Surveillance Working Group has made some progress in devising cross-service standards and practices for some OEHS activities. In addition, the deployed military services have not submitted all of the OEHS reports they have completed for OIF to CHPPM's centralized archive, as required by DOD policy. However, CHPPM officials said that they could not measure the magnitude of noncompliance because they have not received all of the required quarterly consolidated lists of OEHS reports that have been completed. To improve OEHS reporting compliance, DOD officials said they were revising an existing policy to add additional and more specific OEHS requirements.

Data Collection Standards and Practices Vary by Service, Although Preliminary Efforts Are Under Way to Increase Uniformity

OEHS data collection standards[19] and practices have varied among the military services because each service has its own authority to implement broad DOD policies, and the services have taken somewhat different approaches. For example, although one water monitoring standard has been adopted by all military services, the services have different standards for both air and soil monitoring. As a result, for similar OEHS events, preventive medicine units may collect and report different types of data. Each military service's OEHS practices for implementing data collection standards also have differed because of varying levels of training and expertise among the service's preventive medicine units. For example, CHPPM officials said that Air Force and Navy preventive medicine units had more specialized personnel with a narrower focus on specific OEHS activities than Army preventive medicine units, which included more generalist personnel who conducted a broader range of OEHS activities. Air Force preventive medicine units generally have included a flight surgeon, a public health officer, and bioenvironmental engineers. Navy preventive medicine units generally have included a preventive medicine physician, an industrial hygienist, a microbiologist, and an entomologist. In contrast, Army preventive medicine unit personnel generally have consisted of environmental science officers and technicians.

[19]OEHS standards generally set out technical requirements for monitoring, including the type of equipment needed and the appropriate frequency of monitoring.

DOD officials also said other issues could contribute to differences in data collected during OIF. DHSD officials said that variation in OEHS data collection practices could occur as a result of resource limitations during a deployment. For example, some preventive medicine units may not be fully staffed at some bases. A Navy official also said that OEHS data collection can vary as different commanders set guidelines for implementing OEHS activities in the deployment theater.

To increase the uniformity of OEHS standards and practices for deployments, the military services have made some progress—particularly in the last 2 years—through their collaboration as members of the Joint Environmental Surveillance Working Group. For example, the working group has developed a uniform standard, which has been adopted by all the military services, for conducting environmental health site assessments, which are a type of baseline OEHS report.[20] These assessments have been used in OIF to evaluate potential environmental exposures that could have an impact on the health of deployed servicemembers and determine the types of routine OEHS monitoring that should be conducted. Also, within the working group, three subgroups—laboratory, field water, and equipment—have been formed to foster the exchange of information among the military services in developing uniform joint OEHS standards and practices for deployments. For example, DHSD officials said the equipment subgroup has been working collaboratively to determine the best OEHS instruments to use for a particular type of location in a deployment.

Deployed Military Services Have Not Submitted All Required OEHS Reports for OIF, and the Magnitude of Noncompliance Is Unknown

The deployed military services have not submitted all the OEHS reports that the preventive medicine units completed during OIF to CHPPM for archiving, according to CHPPM officials. Since January 2004, CHPPM has compiled four summary reports that included data on the number of OEHS reports submitted to CHPPM's archive for OIF. However, these summary reports have not provided information on the magnitude of noncompliance with report submission requirements because CHPPM has not received all consolidated lists of completed OEHS reports that should be submitted quarterly. These consolidated lists were intended to provide a key inventory of all OEHS reports that had been completed during OIF. Because there are no requirements on the specific number or type of OEHS reports that must be created for each base, the quarterly

[20]This standard was approved in October 2003.

consolidated lists are CHPPM's only means of assessing compliance with OEHS report submission requirements. Our analysis of data supporting the four summary reports[21] found that, overall, 239 of the 277 bases[22] had at least one OEHS baseline (139) or routine (211) report submitted to CHPPM's centralized archive through December 2004.[23]

DOD officials suggested several obstacles that may have hindered OEHS reporting compliance during OIF. For example, CHPPM officials said there are other, higher priority operational demands that commanders must address during a deployment. In addition, CHPPM officials said that some of the deployed military services' preventive medicine units might not understand the types of OEHS reports to be submitted or might view them as an additional paperwork burden. CHPPM and other DOD officials added that some preventive medicine units might have limited access to communication equipment to send reports to CHPPM for archiving.[24] CHPPM officials also said that while they had the sole archiving responsibility, CHPPM did not have the authority to enforce OEHS reporting compliance for OIF—this authority rests with the Joint Staff and the commander in charge of the deployment.

DOD has several efforts under way to improve OEHS reporting compliance. CHPPM officials said they have increased communication with deployed preventive medicine units and have facilitated coordination among each service's preventive medicine units prior to deployment. CHPPM has also conducted additional OEHS training for some preventive medicine units prior to deployment, including both refresher courses and information about potential hazards specific to the locations where the units were being deployed. In addition, DHSD officials said they were revising an existing policy to add additional and more specific OEHS requirements. However, at the time of our review, a draft of the revision

[21]Incident-driven reports reflect OEHS investigation of unexpected incidents and would not be submitted to CHPPM's archive according to any identified pattern. Therefore, we did not comment on the services' submission of incident-driven reports.

[22]The U.S. Central Command has established and closed bases throughout the OIF deployment; therefore, the number of bases for each summary report varied.

[23]A base may have had both baseline and routine reports submitted to the OEHS archive.

[24]DOD officials said that during a deployment, preventive medicine units share the military's classified communication system with all other deployed units and transmission of OEHS reports might be a lower priority than other mission communications traffic. Also, preventive medicine units might not deploy with communications equipment.

had not been released, and therefore specific details about the revision were not available.

Progress Made in Using OEHS Reports to Address Immediate Health Risks, Though Limitations Remain for Addressing Both Immediate and Long-term Health Issues

DOD has made progress in using OEHS reports to address immediate health risks during OIF, but limitations remain in employing these reports to address both immediate and long-term health issues. During OIF, OEHS reports have been used as part of operational risk management activities intended to assess, mitigate, and communicate to servicemembers any potential hazards at a location. There have been no systematic efforts by DOD or the military services to establish a system to monitor the implementation of OEHS risk management activities, although DHSD officials said they considered the relatively low rates of disease and nonbattle injury in OIF an indication of OEHS effectiveness. In addition, DOD's centralized archive of OEHS reports for OIF is limited in its ability to provide information on the potential long-term health effects related to occupational and environmental exposures for several reasons, including limited access to most OEHS reports because of their security classification, incomplete data on servicemembers' deployment locations, and the lack of a comprehensive federal research plan incorporating the use of archived OEHS reports.

DOD Has Made Progress in Using Deployment OEHS Data and Reports in Risk Management but Does Not Monitor Implementation of These Efforts

To identify and reduce the risk of immediate health hazards in OIF, all of the military services have used preventive medicine units' OEHS data and reports in an operational risk management process. A DOD official said that while DOD had begun to implement risk management to address occupational and environmental hazards in other recent deployments, OIF was the first major deployment to apply this process throughout the deployed military services' day-to-day activities, beginning at the start of the operation.[25] The operational risk management process includes risk assessments of deployment locations, risk mitigation activities to limit potential exposures, and risk communication to servicemembers and commanders about potential hazards.

[25]OEHS risk management activities began to be employed during previous deployments, such as Operation Joint Guardian in Kosovo and Operation Enduring Freedom in Central Asia, but it was not formally adopted as a tool to assess deployment health hazards until 2002. See Office of the Chairman, The Joint Chiefs of Staff, Memorandum MCM-0006-02, "Updated Procedures for Deployment Health Surveillance and Readiness," Feb. 1, 2002.

- Risk Assessments. Preventive medicine units from each of the services have generally used OEHS information and reports to develop risk assessments that characterized known or potential hazards when new bases were opened in OIF. CHPPM's formal risk assessments have also been summarized or updated to include the findings of baseline and routine OEHS monitoring conducted while bases are occupied by servicemembers, CHPPM officials said. During deployments, commanders have used risk assessments to balance the identified risk of occupational and environmental health hazards, and other operational risks, with mission requirements. Generally, OEHS risk assessments for OIF have involved analysis of the results of air, water, or soil monitoring.[26] CHPPM officials said that most risk assessments that they have received characterized locations in OIF as having a low risk of posing health hazards to servicemembers.[27]

- Risk Control and Mitigation. Using risk assessment findings, preventive medicine units have recommended risk control and mitigation activities to commanders that were intended to reduce potential exposures at specific locations. For OIF, risk control and mitigation recommendations at bases have included such actions as modifying work schedules, requiring individuals to wear protective equipment, and increasing sampling to assess any changes and improve confidence in the accuracy of the risk estimate.

- Risk Communication. Risk assessment findings have also been used in risk communication efforts, such as providing access to information on a Web site or conducting health briefings to make servicemembers aware of occupational and environmental health risks during a deployment and the recommended efforts to control or mitigate those risks, including the need for medical follow-up. Many of the risk assessments for OIF we reviewed recommended that health risks be communicated to servicemembers.

While risk management activities have become more widespread in OIF compared with previous deployments, DOD officials have not conducted systematic monitoring of deployed military services' efforts to conduct

[26]An Army operational risk management field manual describes the steps in determining risk level, including identifying the hazard, assessing the severity of the hazard, and determining the probability that the hazard will occur. DOD has also developed technical guides that detail toxicity thresholds and associated potential health effects from exposure to hazards.

[27]Risk assessments can designate identified occupational or environmental health risks as posing a low, moderate, high, or extremely high risk to servicemembers.

OEHS risk management activities. As of March 2005, neither DOD nor the military services had established a system to examine whether required risk assessments had been conducted, or to record and track resulting recommendations for risk mitigation or risk communication activities. In the absence of a systematic monitoring process, CHPPM officials said they conducted ad hoc reviews of implementation of risk management recommendations for sites where continued, widespread OEHS monitoring has occurred, such as at Port Shuaiba, Kuwait, a deepwater port where a large number of servicemembers have been stationed, or other locations with elevated risks. DHSD officials said they have initiated planning for a comprehensive quality assurance program for deployment health that would address OEHS risk management, but the program was still under development.

DHSD and military service officials said that developing a monitoring system for risk management activities would face several challenges. In response to recommendations for risk mitigation and risk communication activities, commanders may have issued written orders and guidance that were not always stored in a centralized, permanent database that could be used to track risk management activities. Additionally, DHSD officials told us that risk management decisions have sometimes been recorded in commanders' personal journals or diaries, rather than issued as orders that could be stored in a centralized, permanent database.

In lieu of a monitoring system, DHSD officials said that DOD considers the rates of disease and nonbattle injury in OIF as a general measure or indicator of OEHS effectiveness. As of January 2005, OIF had a 4 percent total disease and nonbattle injury rate—in other words, an average of 4 percent of servicemembers deployed in support of OIF had been seen by medical units for an injury or illness in any given week. This rate is the lowest DOD has ever documented for a major deployment, according to DHSD officials. For example, the total disease and nonbattle injury rate for the 1991 Gulf War was about 6.5 percent, and the total rate for Operation Enduring Freedom in Central Asia has been about 5 percent. However, while this indicator provides general information on servicemembers' health status, it is not directly linked to specific OEHS activities and therefore is not a clear measure of their effectiveness.

Access to Most Archived OEHS Reports Is Limited by Security Classification

Access to archived OEHS reports by VA, medical professionals, and interested researchers has been limited by the security classification of most OEHS reports.[28] Typically, OEHS reports are classified if the specific location where monitoring activities occur is identified. VA officials said they would like to have access to OEHS reports in order to ensure appropriate postwar health care and disability compensation for veterans, and to assist in future research studies. However, VA officials said that, because of these security concerns, they did not expect access to OEHS reports to improve until OIF has ended.

Although access to OEHS reports has been restricted, VA officials said they have tried to anticipate likely occupational and environmental health concerns for OIF based on experience from the 1991 Persian Gulf War and on CHPPM's research on the medical or environmental health conditions that exist or might develop in the region. Using this information, VA has developed study guides for physicians on such topics as health effects from radiation and traumatic brain injury and also has written letters for OIF veterans about these issues.

DOD has begun reviewing classification policies for OEHS reports, as required by the Ronald W. Reagan National Defense Authorization Act for Fiscal Year 2005.[29] A DHSD official said that DOD's newly created Joint Medical Readiness Oversight Committee is expected to review ways to reduce or limit the classification of data, including data that are potentially useful for monitoring and assessing the health of servicemembers who have been exposed to occupational or environmental hazards during deployments.

[28]Individuals desiring to review classified documents must have the appropriate level of security clearance and a need to access the information. VA officials have been able to access some OEHS data on a case-by-case basis.

[29]Pub. L. No. 108-375, §735, 118 Stat. 1811, 1999 (2004).

Difficulties Exist in Linking Archived OEHS Reports to Individual Servicemembers, but Some Efforts Are Under Way to Include Information in Medical Records

Linking OEHS reports from the archive to individual servicemembers will be difficult because DOD's centralized tracking database for recording servicemembers' deployment locations currently does not contain complete or comparable data. In May 1997, we reported that the ability to track the movement of individual servicemembers within the theater is important for accurately identifying exposures of servicemembers to health hazards.[30] However, the Defense Manpower Data Center's centralized database has continued to experience problems in obtaining complete, comparable data from the services on the location of servicemembers during deployments, as required by DOD policies.[31] Data center officials said the military services had not reported location data for all servicemembers for OIF. As of October 2004, the Army, Air Force, and Marine Corps each had submitted location data for approximately 80 percent of their deployed servicemembers, and the Navy had submitted location data for about 60 percent of its deployed servicemembers.[32] Additionally, the specificity of location data has varied by service. For example, the Marine Corps has provided location of servicemembers only by country, whereas each of the other military services has provided more detailed location information for some of their servicemembers, such as base camp name or grid coordinate locations. Furthermore, the military services did not begin providing detailed location data until OIF had been ongoing for several months.

DHSD officials said they have been revising an existing policy[33] to provide additional requirements for location data that are collected by the military

[30]GAO, *Defense Health Care: Medical Surveillance Improved Since Gulf War, but Mixed Results in Bosnia,* GAO/NSIAD-97-136 (Washington D.C.: May 13, 1997).

[31]DOD policy requires the Defense Manpower Data Center to maintain a system that collects information on deployed forces, including daily-deployed strength, in total and by unit; grid coordinate locations for each unit (company size and larger); and inclusive dates of individual servicemembers' deployment. See DOD Instruction 6490.3, "Implementation and Application of Joint Medical Surveillance for Deployment," Aug. 7, 1997. In addition, a 2002 DOD policy requires combatant commands to provide the Defense Manpower Data Center with rosters of all deployed personnel, their unit assignments, and the unit's geographic locations while deployed. See Office of the Chairman, The Joint Chiefs of Staff, Memorandum MCM-0006-02, "Updated Procedures for Deployment Health Surveillance and Readiness," February 1, 2002.

[32]The military services submitted location data for both OIF and Operation Enduring Freedom in Central Asia; Defense Manpower Data Center officials said they were unable to separate the data from the two operations.

[33]DOD Instruction 6490.3, "Implementation and Application of Joint Medical Surveillance for Deployment," Aug. 7, 1997.

services, such as a daily location record with grid coordinates or latitude and longitude coordinates for all servicemembers. Though the revised policy has not been published, as of May 2005 the Army and the Marine Corps had implemented a new joint location database in support of OIF that addresses these revisions.

During OIF, some efforts have been made to include information about specific incidents of potential and actual exposure to occupational or environmental health hazards in the medical records of servicemembers who may have been affected. According to DOD officials, preventive medicine units have been investigating incidents involving potential exposure during the deployment. For a given incident, a narrative summary of events and the results of any medical procedures generally were included in affected servicemembers' medical records. Additionally, rosters were generally developed of servicemembers directly affected and of servicemembers who did not have any acute symptoms but were in the vicinity of the incident. For example, in investigating an incident involving a chemical agent used in an improvised explosive device, CHPPM officials said that two soldiers who were directly involved were treated at a medical clinic, and their treatment and the exposure were recorded in their medical records. Although 31 servicemembers who were providing security in the area were asymptomatic, doctors were documenting this potential exposure in their medical records.

In addition, the military services have taken some steps to include summaries of potential exposures to occupational and environmental health hazards in the medical records of servicemembers deployed to specific locations. The Air Force has created summaries of these hazards at deployed air bases and has required that these be placed in the medical records of all Air Force servicemembers stationed at these bases. (See app. I for an example.) However, Air Force officials said no follow-up activities have been conducted specifically to determine whether all Air Force servicemembers have had the summaries placed in their medical records. Similarly, the Army and Navy jointly created a summary of potential exposure for the medical records of servicemembers stationed at Port Shuaiba, the deepwater port used for bringing in heavy equipment in support of OIF where a large number of servicemembers have been permanently or temporarily stationed. Since December 2004, port officials have made efforts to make the summary available to servicemembers stationed at Port Shuaiba so that these servicemembers can include the summary in their medical records. However, there has been no effort to retroactively include the summary in the medical records of servicemembers stationed at the port prior to that time.

No Federal Research Plan Exists for Using OEHS Reports to Follow the Health of OIF Servicemembers over Time

According to DOD and VA officials, no federal research plan that includes the use of archived OEHS reports has been developed to evaluate the long-term health of servicemembers deployed in support of OIF, including the effects of potential exposure to occupational or environmental hazards. In February 1998 we noted that the federal government lacked a proactive strategy to conduct research into Gulf War veterans' health problems and suggested that delays in planning complicated researchers' tasks by limiting opportunities to collect critical data.[34] However, the Deployment Health Working Group, a federal interagency body responsible for coordinating research on all hazardous deployments, recently began discussions on the first steps needed to develop a research plan for OIF.[35] At its January 2005 meeting, the working group tasked its research subcommittee to develop a complete list of research projects currently under way that may be related to OIF.[36] VA officials noted that because OIF is ongoing, the working group would have to determine how to address a study population that changes as the number of servicemembers deployed in support of OIF changes.[37]

Although no coordinated federal research plan has been developed, other separate federal research studies are underway that may follow the health of OIF servicemembers. For example, in 2000 VA and DOD collaborated to develop the Millennium Cohort study, a 21-year longitudinal study evaluating the health of both deployed and nondeployed military personnel throughout their military careers and after leaving military service. According to the principal investigator, the Millennium Cohort study was designed to examine the health effects of specific deployments if enough servicemembers in that deployment enrolled in the study. However, the principal investigator said that as of February 2005 researchers had not identified how many servicemembers deployed in support of OIF had enrolled in the study. In another effort, a VA researcher has received funding to study mortality rates among OIF servicemembers. According to the researcher, if occupational and environmental data are

[34]GAO, *Gulf War Illnesses: Federal Research Strategy Needs Reexamination,* GAO/T-NSIAD-98-104 (Washington D.C.: Feb. 24, 1998).

[35]The Deployment Health Working Group includes representatives from DOD, VA, and HHS.

[36]This effort also includes identifying research for Operation Enduring Freedom.

[37]Epidemiologic studies generally have a fixed study population that does not vary over time, according to VA officials.

available, the study will include the evaluation of mortality outcomes in relation to potential exposure for OIF servicemembers.

Concluding Observations

As we stated in our report, DOD's efforts to collect and report OEHS data could be strengthened. Currently, OEHS data that the deployed military services have collected during OIF may not always be comparable because of variations among the services' data collection standards and practices. Additionally, the deployed military services' uncertain compliance with OEHS report submission requirements casts doubt on the completeness of CHPPM's OEHS archive. These data shortcomings, combined with incomplete data in DOD's centralized tracking database of servicemembers' deployment locations, limit CHPPM's ability to respond to requests for OEHS information about possible exposure to occupational and environmental health hazards of those who are serving or have served in OIF. DOD officials have said they are revising an existing policy on OEHS data collection and reporting to add additional and more specific OEHS requirements. However, unless the military services take measures to direct those responsible for OEHS activities to proactively implement the new requirements, the services' efforts to collect and report OEHS data may not improve. Consequently, we recommended that the Secretary of Defense ensure that cross-service guidance is created to implement DOD's policy, once that policy has been revised, to improve the collection and reporting of OEHS data during deployments and the linking of OEHS reports to servicemembers. DOD responded that cross-service implementation guidance for the revised policy on deployment OEHS would be developed by the Joint Staff.

While DOD's risk management efforts during OIF represent a positive step in helping to mitigate potential environmental and occupational risks of deployment, the lack of systematic monitoring of the deployed military services' implementation activities prevents full knowledge of their effectiveness. Therefore, we recommended that the military services jointly establish and implement procedures to evaluate the effectiveness of risk management efforts. DOD partially concurred with our recommendation and stated that it has procedures in place to evaluate OEHS risk management through a jointly established and implemented lessons learned process. However, in further discussions, DOD officials told us that they were not aware of any lessons learned reports related to OEHS risk management for OIF.

Furthermore, although OEHS reports alone are not sufficient to identify the causes of potential long-term health effects in deployed servicemembers, they are an integral component of research to evaluate the long-term health of deployed servicemembers. However, efforts by a joint DOD and VA working group to develop a federal research plan for OIF that would include examining the effects of potential exposure to occupational and environmental health hazards have just begun, despite similarities in deployment location to the 1991 Persian Gulf War. As a result, we recommended that DOD and VA work together to develop a federal research plan to follow the health of servicemembers deployed in support of OIF that would include the use of archived OEHS reports. DOD partially concurred with our recommendation, and VA concurred. The difference in VA and DOD's responses to this recommendation illustrates a disconnect between each agency's understanding of whether and how such a federal research plan should be established. Therefore, continued collaboration between the agencies to formulate a mutually agreeable process for proactively creating a federal research plan would be beneficial in facilitating both agencies' ability to anticipate and understand the potential long-term health effects related to OIF deployment versus taking a more reactive stance in waiting to see what types of health problems may surface.

Mr. Chairman, this completes my prepared statement. I would be happy to respond to any question you or other Members of the Subcommittee may have at this time.

GAO Contact and Staff Acknowledgments

For further information about this testimony, please contact Marcia Crosse at (202) 512-7119 or crossem@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this testimony. In addition to the contacts named above, Bonnie Anderson, Assistant Director, Karen Doran, Beth Morrison, John Oh, Danielle Organek, and Roseanne Price also made key contributions to this testimony.

Appendix I: Example of an Occupational and Environmental Health Surveillance Summary Created by the Air Force

PREVIOUS EDITION IS USABLE — AUTHORIZED FOR LOCAL REPRODUCTION

MEDICAL RECORD	CHRONOLOGICAL RECORD OF MEDICAL CARE
DATE	SYMPTOMS, DIAGNOSIS, TREATMENT, TREATING ORGANIZATION *(Sign each entry)*

ENVIRONMENTAL/OCCUPATIONAL HEALTH WORKPLACE EXPOSURE DATA

This assessment covers individuals deployed to **BAGHDAD AIR BASE (BDAB), IRAQ** for the time period **15 DEC 03 to 30 APR 2004**.

Purpose: To comply with the deployment health surveillance requirements of Presidential Review Directive 5 and JCSM 0006-02, Updated Procedures for Deployment Health Surveillance and Readiness. **CENTAF/SG officially sanctions use of this form and recommends it be maintained in the individual's permanent medical record with the DD Form 2796, Post Deployment Health Assessment, covering the same time period.**

Camps Sather and Griffin, the primary AF locations on Baghdad International Airport (BIAP), were part of the Iraqi Military Training portion of BIAP. However, this specific area was not heavily used. The small Iraqi terminal on site was for military guests and distinguished visitors. Base housing and training was on the other side of the main road outside Camp Sather. While there is farming around BIAP, we are not aware of any specific farming activities within Camp Sather; however, there is evidence of flooded fields in/around Camp Griffin. We are also not aware of any major spills within the BIAP AF cantonment. "BDAB" refers to both Camps Sather and Griffin.

Environmental Exposure Data and Risk Assessment:

1. Airborne Dust: The level of airborne particulate matter is high throughout the Middle East due to wind blown dust and sand. Expected health effects associated with exposures to airborne particulates include eye, nose, and throat irritation, sneezing, coughing, sinus congestion, sinus drainage, and aggravation of asthma conditions. Based on air sampling performed in and around BIAP, the overall health risk to personnel from exposure to airborne dust is assessed as low. PM_{10} and manganese air samples taken in late May 2003 indicated concentrations nearly double their respective military exposure guidelines. However, no long-term health affects are anticipated for personnel assigned/deployed for a period less than two years.

2. Airborne Emissions From Petroleum Production/Other Nearby Industrial/Disposal Activities: There are multiple industrial activities near BIAP. Chemical storage and processing plants are located within 5-10 miles of BIAP, primarily to the east and south. However, operations at these facilities are severely limited in the aftermath of combat activities in/around BIAP. Multiple industrial activities, to include manufacturing, construction, and petroleum refining are located in the greater Baghdad metropolitan area. With the prevailing winds from the northwest, BIAP is located downwind from only a few industrial activities, primarily light to medium manufacturing facilities. Routine exposure of BIAP personnel to airborne emissions from off-base industrial sources is assessed as minimal to nonexistent, with no increased risk to health resulting from routine exposure. Army units in/around BIAP no longer 'burn out' human and other waste products, and no units BIAP burn trash/garbage. There is no health risk expected from these intermittent exposures.

3. Endemic Diseases: Leishmaniasis (both cutaneous and visceral) occurs in Iraq at a sporadic level. On-base vector surveillance, during transmission season, yielded many sand flies from unbated traps, some of which tested positive for leishmaniasis. Risk to BDAB personnel is assessed as low, so long as the sand fly burden is kept under control. ***Cases may not present with symptoms until 4-6 months post-redeployment***. Malaria is present in Iraq, but to date has not been a significant issue in the Baghdad area. *Anopheles* mosquitoes are present on BIAP and 95% of endemic malaria is *Plasmodium vivax*. CENTCOM reporting instructions require personnel to treat uniforms with permethrin and apply DEET to exposed skin as necessary to prevent bites. Sanitation varies within the country, but typically is well below U.S. standards. Consuming local food or water poses a significant risk to personnel for bacterial diarrhea. Personnel were advised to consume only food, water, and ice from approved sources. Tuberculosis (TB) disease risk assessment for Iraq is low. Unless individuals had exposure to anyone known or suspected of having active TB, worked closely with refugees or prisoners, or had prolonged contact with the local populace, a post-deployment tuberculin skin test is not required. Plague is restricted to focal areas; enzootic foci historically have existed along the Tigris-Euphrates River--extending to Kuwait. Plague risk assessment is low.

4. Drinking Water: Bottled water is the source of 100% of the drinking water used on BDAB. All bottled water comes from approved sources and is tested by 447 EMEDS to ensure water quality meets all applicable standards. BDAB has a water distribution system that is supplied via truck by US Army reverse osmosis purification units located at North Palace, using water from a lake fed by the Tigris River. Tap water is considered non-potable and only recommended for cleaning and hygiene purposes.

5. Hazardous Animals and Insects: Several species of venomous snakes, scorpions and spiders have been identified on base. Generally, they are limited in number and BDAB personnel experience minimal incidences or contact. Unless otherwise specified in the

HOSPITAL OR MEDICAL FACILITY	STATUS	DEPART./SERVICE	RECORDS MAINTAINED AT
447 EMEDS, Baghdad Air Base Iraq			
SPONSOR'S NAME	SSN/ID NO.	RELATIONSHIP TO SPONSOR	
		Self	

PATIENT'S IDENTIFICATION: (For typed or written entries, give: Name – last, first, middle; ID No or SSN; Sex; Date of Birth; Rank/Grade.)	REGISTER NO.	WARD NO.

CHRONOLOGICAL RECORD OF MEDICAL CARE
Medical Record
STANDARD FORM 600 (REV. 6-97)
Prescribed by GSA/ICMR
FIRMR (41 CFR) 201-9.202-1

DATE	SYMPTOMS, DIAGNOSIS, TREATMENT, TREATING ORGANIZATION (*Sign each entry*)

ENVIRONMENTAL/OCCUPATIONAL HEALTH WORKPLACE EXPOSURE DATA (continued)

medical record, individual reported no adverse contact (i.e. bites). Feral cats and dogs have also been noted in the area. Rats and mice have been a nuisance; one rat bite was reported in the summer of 2003.

6. Waste Sites/Waste Disposal: Hazardous waste storage on BDAB is limited to used and off-spec POL products, and small spill cleanup residue. Currently, proper handling, storage, and disposal of industrial waste generated on base (mainly oil, fuel and hydraulic fluid) are strictly enforced. Airborne exposure to base personnel from stored waste is assessed as minimal to nonexistent. No obvious signs of significant past spills or tank leakage were noted when coalition forces occupied BIAP, although POL personnel did drain and remove several extant tanks. Trash and garbage are containerized and routinely collected by contractors. Latrines are pumped out by trucks and waste is disposed off-BIAP.

7. Nuclear, Biological or Chemical (NBC) Weapon Exposure: There has been no evidence of any use, storage, release, or exposure of NBC agents to personnel at this site.

8. Agricultural Emissions: Surrounding land is moderately agricultural. Many farms are within 1-2 miles of the perimeter fence, with numerous potentially flooded fields for rice cultivation. Aerial photos previous to May 2003 revealed that much of BIAP, including parts of the AF cantonment, were rice cultivation areas. While we haven't witnessed any significant application, herbicide/pesticide use probably routinely occurs just outside the base. However, airborne exposure to base personnel is assessed as minimal to nonexistent.

9. Depleted Uranium (DU): DU is a component of some aircraft present and/or transient on/through BDAB. There is no evidence of DU munitions having been expended at BIAP. Therefore, there is no potential airborne exposure to DU. Exposure is classified as far below permissible exposure levels.

10. Hazardous Materials: There are only a few permanent structures on BDAB. Both lead-based paint and potential asbestos-containing material have been tentatively identified in various locations on BIAP; however, personnel are not performing activities that involve routine exposure, thereby minimizing health risk. There were multiple sites where Iraqi hazardous materials caches were located; however, personnel exposures were minimized/eliminated by removing or limiting access to the materials.

Occupational Exposure Data and Risk Assessment:

1. Noise: Aircraft, aircraft ground equipment, generators and other equipment produce hazardous noise. Workers routinely exposed to hazardous noise are those working on or near the flight line and/or in selected industrial shops. These workers have comparable noise exposure at home station and are on the hearing conservation program. For all individuals, appropriate hearing protection is provided for protection against hazardous noise. Additionally, the whole of Camp Sather is within 300 yards of an extremely active flightline.

2. Heat Stress: Daily temperature range: Mar - Oct from 75°F to 125°F; Nov - Feb from 55°F to 95°F. Personnel are continually educated on heat stress dangers, water intake and work/rest cycles. Unless separately documented, individual had no heat related injury.

3. Airborne Exposure to Chemical Hazards: Unless specified in a duty-specific supplement, individual exposure to chemical inhalation is considered similar to duties performed at home station. On base industrial activities include routine aircraft, equipment and installation maintenance. Generally, majority of the chemicals used on BDAB are oils, greases, lubricants, hydraulic fluids and fuel. Little to no corrosion control activities are performed and no solvent tanks exist on site. No industrial activity is performed that generates, or has been expected to generate, airborne exposures above permissible exposure levels or medical action levels.

4. Chemical Contact and Eye Protection: Unless specified in a job-specific supplement, individual exposure to chemical contact is considered similar to duties performed at home station. Workers are provided appropriate protective equipment (i.e. nitrile/rubber gloves, goggles, safety glasses and face shields) when and where needed.

5. Radiation: Ionizing radiation is emitted from medical/dental x-ray and OSI operations, and low-level radioactive materials present in equipment such as chemical agent monitors and alarms. No worker has been identified as exceeding 10% of the 5 REM/year OSHA permissible exposure level. Radio frequency (RF) radiation is emitted from multiple radar systems and communication equipment. Systems are marked with warning signs and communication workers receive appropriate training. Unless otherwise documented, no worker has been identified as exceeding RF-radiation permissible exposure limits. Significant UV radiation from the sun is expected on exposed unprotected skin. BDAB personnel have been advised to minimize sun exposure through the use of sunscreen and wear of sleeves down. Additionally, BDAB is a high light level environment. Many cases of photosensitivity dermatitis were observed. Some were no doubt exacerbated by the use of doxycycline for malaria prophylaxis. Unless otherwise stated in medical record, individual reported no radiation/light related injuries.

6. Ergonomics: Individual exposure to ergonomic stress from job related duty is substantially similar to duties performed at home station, with potential moderate increase in lifting involved with unique deployment requirements such as erection of tents and shelters. Unless otherwise stated in medical record, individual reported no ergonomic stress related injuries.

7. Bloodborne Pathogens: Individual exposure to bloodborne pathogens from job related duty is considered similar to duties performed at home station. Applicable workers are provided appropriate protective equipment and have been placed on the bloodborne pathogen program. Unless otherwise stated elsewhere in the medical record, individual reported no significant unprotected exposures.

//SIGNED//

STANDARD FORM 600 (REV. 6-97) BACK

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