The accredited sponsor of this activity is the Indian Health Service Clinical Support Center

Presenter: Capt. Mario E. Fajardo, M.D., USPHS
Internist/Flight Surgeon
Chief, Occupational Medicine

Disclosure: CAPT Fajardo does not have any financial arrangements or affiliations with any corporate organizations, which might constitute a conflict of interest with regard to this continuing education activity.

WELCOME!

PART II OF THIS LECTURE MODULE DEALS WITH THE DEFENSE OCCUPATIONAL AND ENVIRONMENTAL HEALTH READINESS SYSTEM (DOEHRS). THE DOEHRS IS A DEPARTMENT OF DEFENSE (DOD) PROGRAM DESIGNED TO PROVIDE INFORMATION NEEDED BY OCCUPATIONAL HEATH STAFF FOR REDUCING HEALTH THREATS AND TO INTEGRATE OCCUPATIONAL HEALTH INFORMATION BY PROVIDING AUTOMATED SUPPORT FOR THE INDUSTRIAL HYGIENE (IH), OCCUPATIONAL MEDICINE (OM) AND HEARING CONSERVATION PROGRAMS (HCP).

THE SYSTEM WAS INITIALLY INTRODUCED AS THE DEFENSE OCCUPATIONAL HEALTH REPORTING SYSTEM (DOHRS). TO AVOID CONFUSION, PLEASE NOTE THAT MOST OF THE LITERATURE YOU ARE ABOUT TO READ USES BOTH ACRONYMS.

IT IS IMPORTANT FOR COAST GUARD HEALTH CARE PROVIDERS TO BE FAMILIAR WITH THIS SYSTEM. PRESENTLY OVER 30% OF CG PERSONNEL RECEIVE CARE AT DOD FACILITIES AND THEIR INFORMATION IS ALREADY BEING ENTERED INTO THIS SYSTEM. DOD FACILITIES IN THE WEST COAST HAVE ALREADY IMPLEMENTED THE HCP AND IH PORTIONS OF THE SYSTEM AND THE OM PORTION IS RAPIDLY COMING ON-LINE. THE DOEHRS IS PART OF CHCS-II. CG MEDICAL FACILITIES CAN ANTICIPATE BEING PART OF THIS SYSTEM IN THE NOT TOO DISTANT FUTURE.

DOEHRS

DEFENSE OCCUPATIONAL & ENVIRONMENTAL HEALTH READINESS SYSTEM

6 Sept 2000

Mr. William Monk
Project Manager

CHCS II
COMPOSITE HEALTH CARE SYSTEM II

BRIEFING AGENDA

- Project Overview
- Organizational Alignment
- Mandates for DOEHRS
- DOEHRS Functions
- DOEHRS Schedules
- DOEHRS Deployment Maps
- DOEHRS-IH Objectives
- Exposure Assessment Process
- Deployment Occupational & Environmental Health
- Mobility
- Architecture
- Training
- Support
- Data Repository
- Questions and Conclusion

PROJECT OVERVIEW

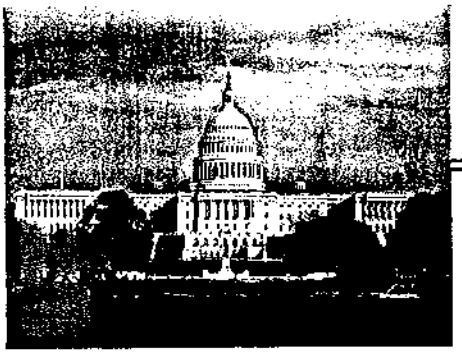
- The DOEHRS is the Occupational Health migration system for the Department of Defense (DoD). DOEHRS is an automated information system designed to support the DoD Industrial Hygiene (IH), Environmental Health (EH), Hearing Conservation (HC), and Occupational Medicine (OM) programs.
- DoD MHS Information Management Proponent Committee (IMPC) re-confirmed decision in October 1999

ORGANIZATIONAL ALIGNMENT

- USA Center for Health Promotion and Preventive Medicine provides TDA positions and Logistics for Project Management Office
- DoD Health Affairs Clinical Business Area provides Information Technology management direction and funding
- MHS Program Executive Office oversight
- DOHRS PMO Liaison position located in CBA
- DOHRS Technical Liaison position located in CBA (split time between CBA and PMO)

MANDATES FOR DOHRS

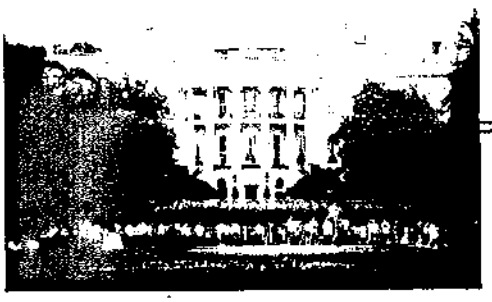
- Public Law 105-85
- Presidential Statement
- Presidential Review Directive (PRD-5)
- DoDD 6490.2 and DoDI 6490.3, Joint Medical Surveillance, Implementation and Application of Joint Medical Surveillance for Deployments
- Medical Programming Guidance
- Medical Readiness Strategic Plan



PUBLIC LAW

This portion of the National Defense Authorization Act for Fiscal Year 1998 adds a new Section 1074f to Chapter 55 of Title 10 US Code which requires a medical tracking system for members deployed overseas and asks for a report on the FY99-FY04 costs and operational considerations of the required system.

FY1998 Public Law 105-85 for Force Health Protection



PRESIDENTIAL DIRECTIVE

I am directing the Department of Defense and Veterans Affairs to create a new Force Health Protection program. Every soldier, sailor, airman, and marine will have a **comprehensive, life-long medical record** of all illnesses and injuries they suffer, the care and inoculations they receive and their **exposure to different hazards**. These records will help us prevent illness and identify and cure those that occur.

President William Clinton, 8 Nov 1997

A NATIONAL OBLIGATION

PRD 5

- Actions to ameliorate, avoid, or, ideally, prevent such health effects include: improving service member's understanding of health risk information; improving medical and non-medical countermeasures; **enhancing government collection of health and exposure data, along with improving linkages between health information systems**; coordinating agency research programs; and improving delivery of health care services to veterans and their families.

DoD DIRECTIVE/INSTRUCTION

Joint Medical Surveillance

DoDD 6490.2 and DoDI 6490.3 establish and implement Joint Medical Surveillance policies and procedures. The DoDI states (para F 2 a (1)) that OASD(HA) shall field DoD medical systems that will capture exposure data in central repositories and specifically names the Defense Occupational Health Readiness System (DOHRS=DOEHRS) as one of the systems.

DOEHRS FUNCTIONALITY

- DOEHRS supports the DoD mission to control or eliminate hazardous occupational and environmental exposures and perform clinical prevention via occupational medicine. DOEHRS supports three integrated functional areas.
  - **Industrial Hygiene/Environmental Health - Exposures**
  - **Occupational Medicine – Clinical Intervention**
  - **Hearing Conservation – Clinical Intervention**

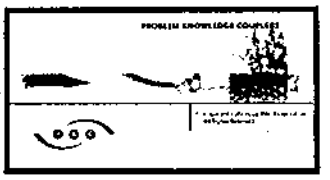
FUNCTIONAL INVOLVEMENT

USERS IDENTIFIED "THEIR" REQUIREMENTS

- DoD Preventive Medicine Working Group
- DoD Occupational Health Working Group
- Joint Environmental (Health) Surveillance Working Group (JESWG)
- DoD Hearing Conservation Working Group
- DoD Clinical Working Group approval
- DOEHRS-IH Functional Working Group
- DoD Ergonomics Working Group
- DoD Industrial Hygiene Task Force
- DOEHRS-IH Presentation Layer Working Group

OCCUPATIONAL MEDICINE

- Occupational Medicine Templates will include ICD-E (external causes) codes
- CHCS II Increment 2 integration FY 2000
- Occupational Health Substance Screening Matrix Coupler Set (Initial 27 Substances)
  - Integrate with the CHCS II, as well as be able to function independent of the CHCS II Application.
  - Supports a DoD-wide uniform and standardized approach to assessing exposure candidates at any location in the system; and the provision of individualized guidance at the point of care.



DOEHRS HEARING CONSERVATION

USAF
360K Annual
Audiograms

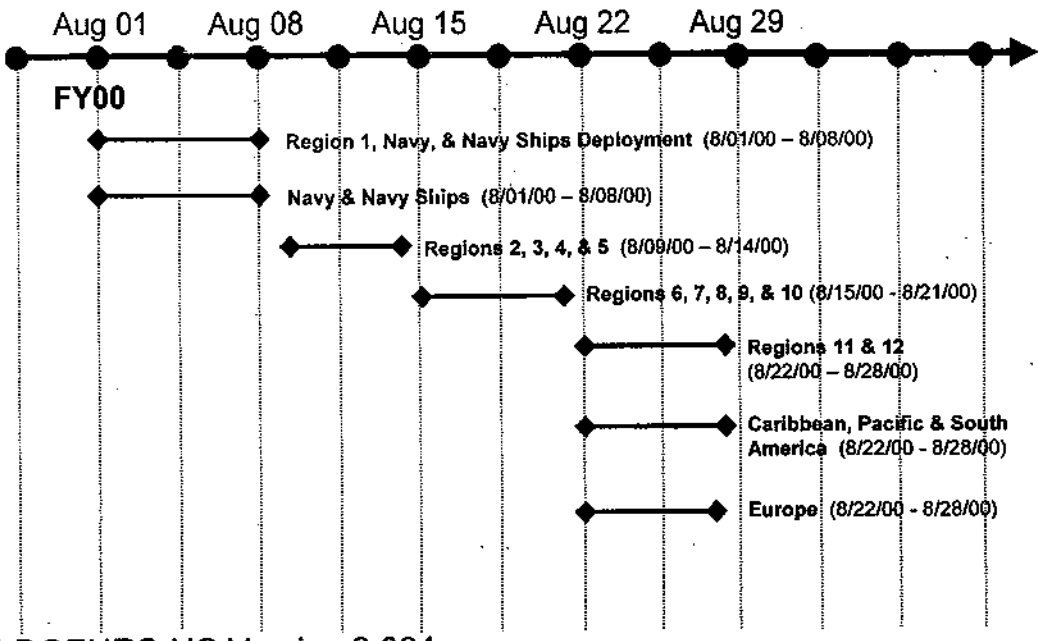
COMBAT READINESS THROUGH HEARING CONSERVATION

USA
841K Annual
Audiograms

USN
675K Annual
Audiograms

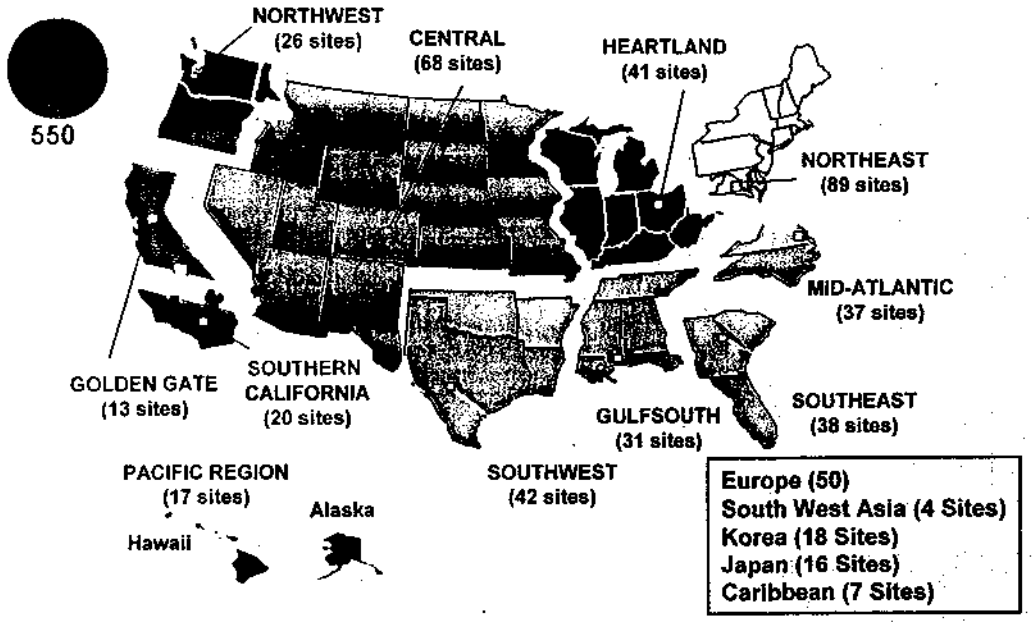
- Extensive Modifications to USA/USAF HEARS
- State-of-the-Art Audiometers
- Complete Hardware Replacement
- Tri-Service Deployment April - September 1999
  - 19 Countries
  - 550 DoD Sites
  - USA: 100%, USN: 100%, USAF: 100% Complete

DOEHRS-HC* SCHEDULE



* DOEHRS-HC Version 2.064

DOEHRS-HC DEPLOYMENT MAP



DOEHRS INDUSTRIAL HYGIENE
BACKGROUND

- Collect all exposure information
  - "Environmental" & "Occupational" exposures
  - Deployments & fixed facilities
  - Army, Navy, Marine Corps, Air Force, Defense Agencies
- Local value to Commanders
  - HEALTH risks → Operational Risk Mgt
- Central medical record of ALL exposures
  - Duration of employment + 40 years

DOEHRS-IH KEY OBJECTIVES

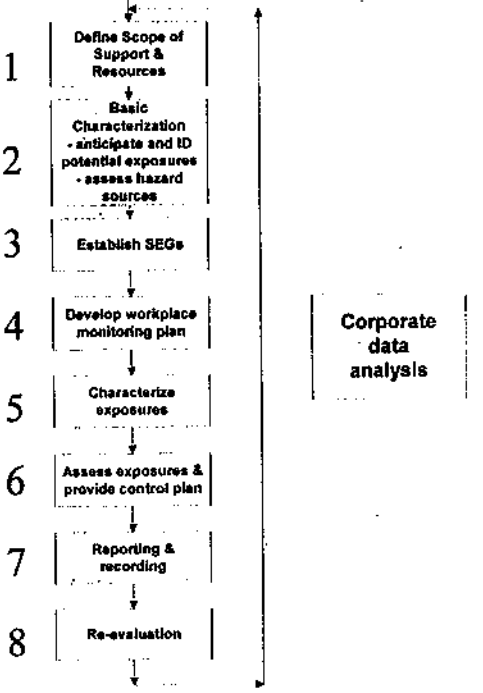
- Prevent occupationally related illnesses and injuries by anticipating, recognizing, and evaluating hazards; and by recommending controls to commanders, supervisors, exposed personnel and Occupational Safety and Health Managers for implementation
- Characterize occupational and environmental health exposures to enable targeted medical surveillance and treatment by health care providers
- Investigate abnormal medical findings and trends referred to IH from health care providers to prevent illness or injury

DOEHRS-IH KEY OBJECTIVES

- Establish and document a historical record of exposure levels for personnel, and communicate exposure monitoring results
- Provide tools for IH decision support
- Streamline IH operations by supporting personnel and workplace monitoring (WPM), medical surveillance, and decision-making
- Streamline data entry through downloads of demographic and clinically relevant data from other DoD systems.

EXPOSURE ASSESSMENT PROCESS

DOEHRS uses the DoD Exposure Assessment Model



DEPLOYMENT OCCUPATIONAL & ENVIRONMENTAL HEALTH STRATEGY

- Fundamental Strategy: Incorporate Deployment OEHS requirements into existing MHS Systems.
- The ultimate goal is to link deployed and non-deployed occupational and environmental health exposure information to individual medical records.
  - By linking DOEHRS, Composite Health Care System II (CHCS II), and the Theater Medical Information Program (TMIP), this link becomes reality.

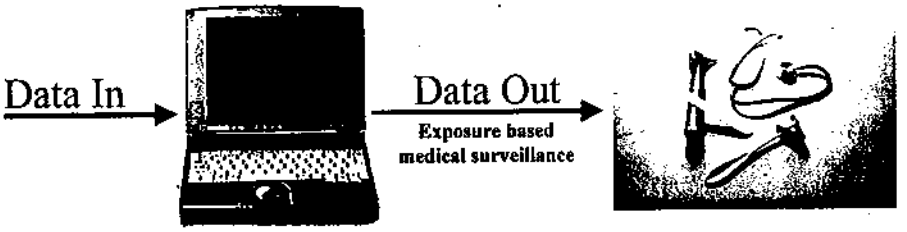
DEPLOYMENT OEHS SURVEILLANCE

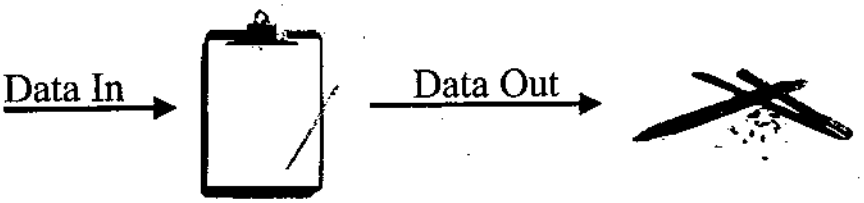
Area Medical Lab calibrating Personal Air Sampling Devices used in assessing Occupational and Environmental Health Exposures

DEPLOYMENT OEHS SURVEILLANCE

Chemical Agent Resistant Coating
Spray painting during Gulf War

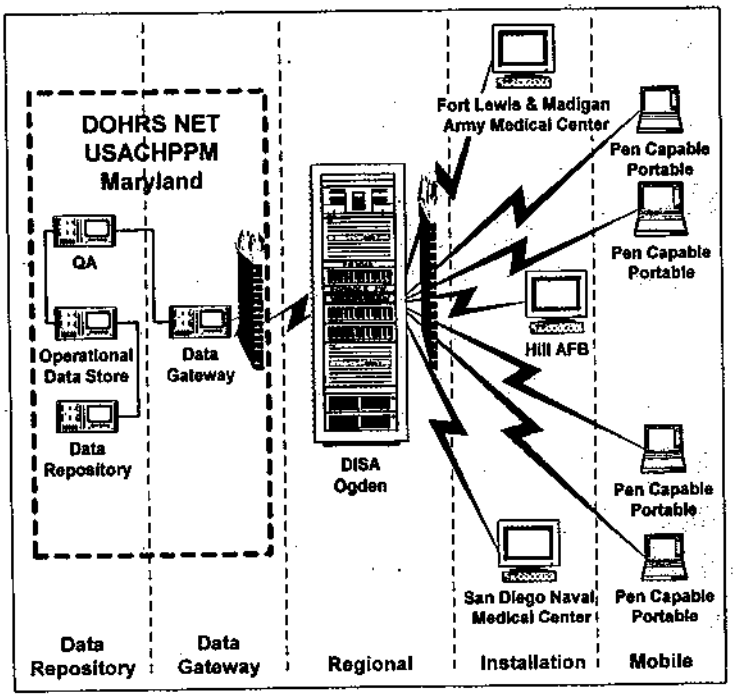
MOBILE/PEN CAPABLE COMPUTERS



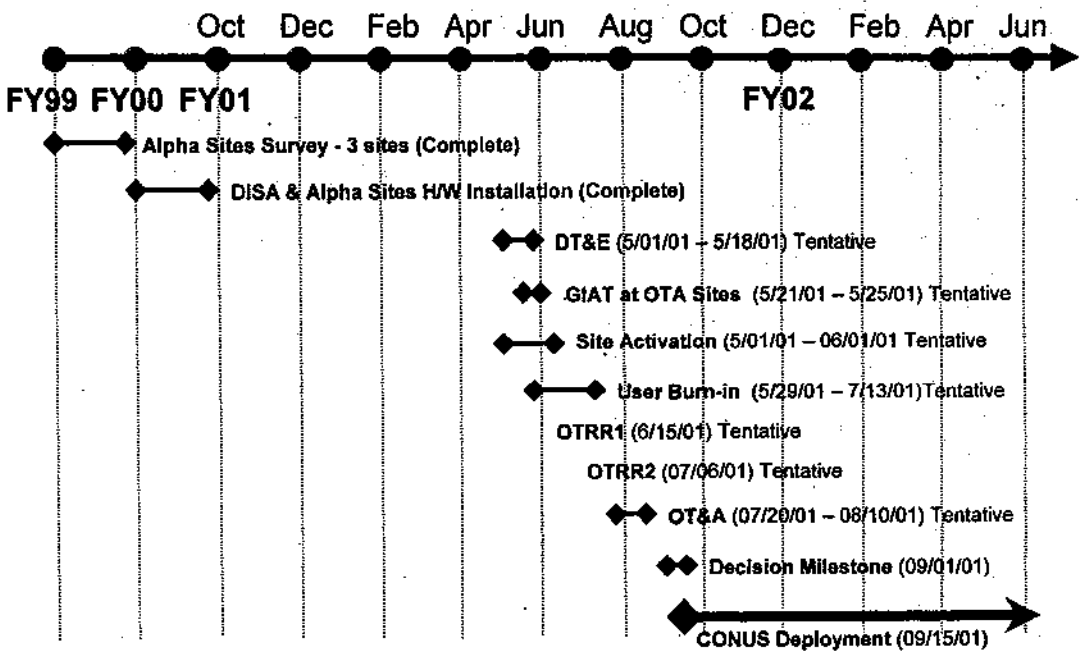


DOEHRS-IH ARCHITECTURE

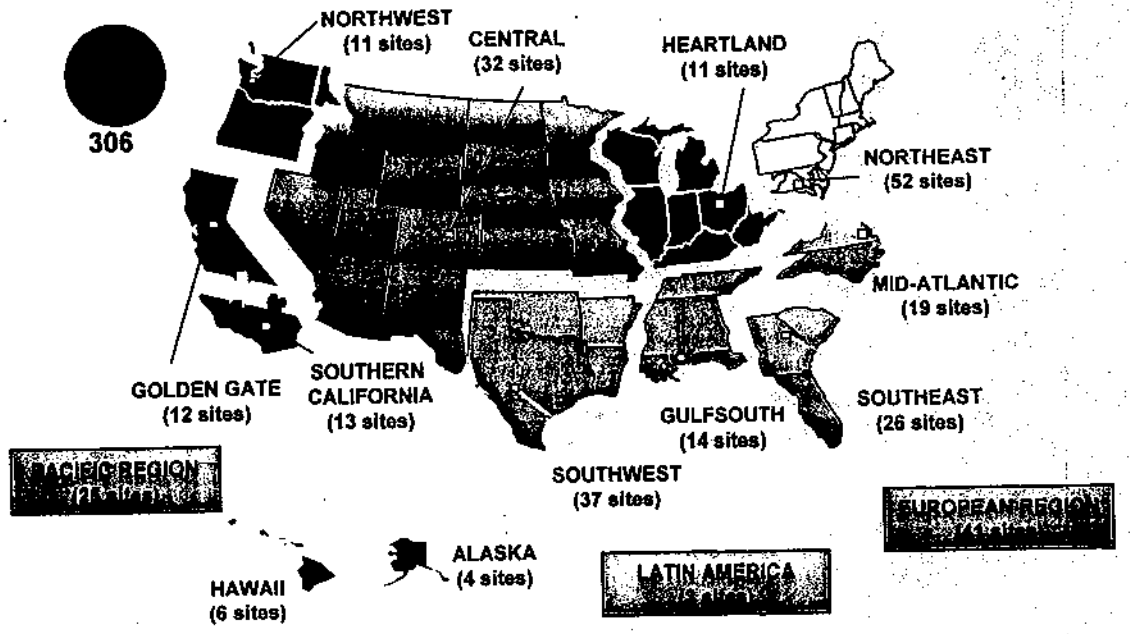
ALPHA TESTING CONFIGURATION



DOEHRS-IH SCHEDULE

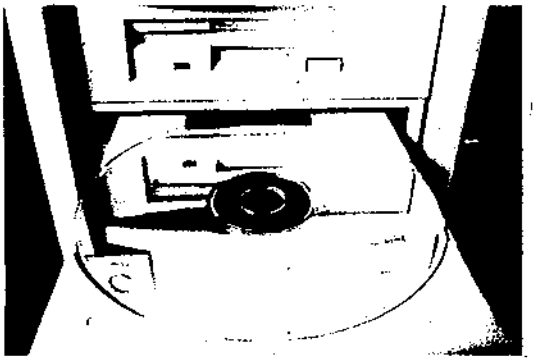


DOEHRS-IH DEPLOYMENT MAP



DOEHRS-IH TRAINING

Computer Based Training (CBT)



Initial On-Site Training using DOEHRS End User Devices (EUDs)

HELP DESK SUPPORT

TMSSC

Tri-Service Medical Systems Support Center

TMSSC (Tier 1)

SAIC (Tier 2 & 3)

Hardware Warranty (GTSI*)

Toll Free Access in CONUS and OCONUS

*Vendor dependent

DOEHRS DATA REPOSITORY
INTERNET ACCESS

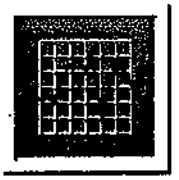
- Provide World-Wide Tri-Service Access
- Provide Secure Transactions
- Automate Data Calls
- Automate Software Version Control
- Web Access to Required References
- Web Access to Licensed Resources

DOEHRS DATA REPOSITORY
DESIGN METHODOLOGY

- **Operational Data Store (ODS)**
  - Houses tactical data from production systems and is subject-oriented and integrated to address operational needs
  - Detailed, current information of a transactional nature, refreshed frequently, and only held for a short period of time (normally)
  - Goal is to provide a tactically-structured, efficient information processing environment to satisfy analysis and reporting capabilities required for the day-to-day operations of the business.
- **Data Repository (DR)**
  - Stores data from operational data sources, using structures organized around major subject areas such as person, MACOM, DOD component, and sample.
  - Goal is to provide an enterprise structured, efficient information processing service through increased accessibility, standardization and reliability of timely information.

DOEHRS DATA REPOSITORY
REPORTING TOOLS

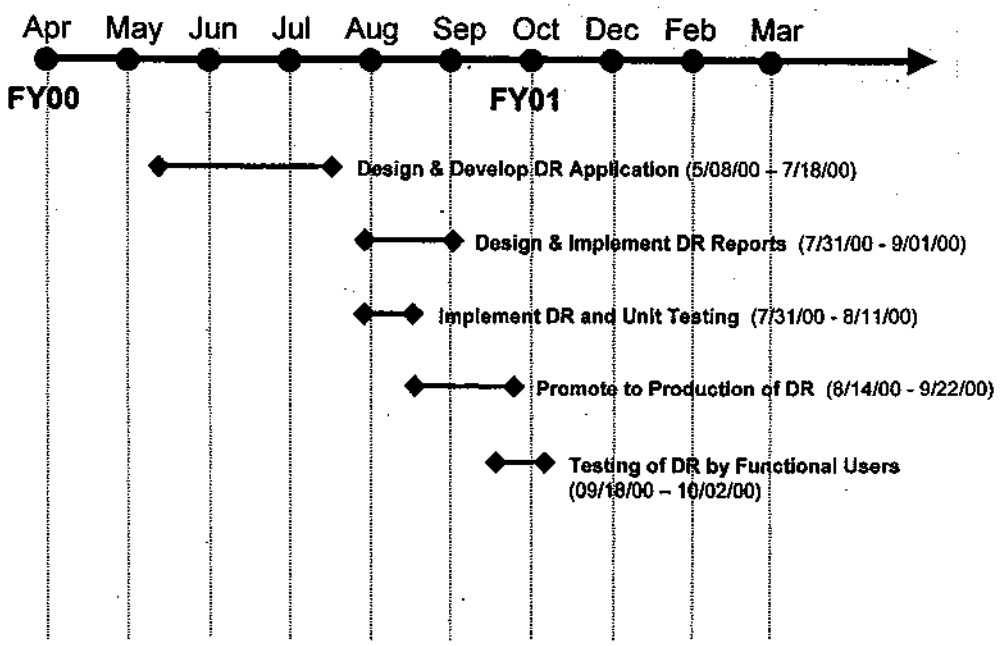
- Pre-Defined Periodic Reports
- Ad-Hoc Queries
- Trend Analysis
- Statistical and "What If" Analysis



DOEHRS NET RESOURCES
CURRENT LICENSED INTERNET ACCESS

- Micromedex TOMES Consolidated Point Solution System
  - MEDITEXT (Medical Management)
  - HAZARDTEXT (Hazard Management)
  - INFOTEXT - Regulations, Standards and General Information
  - CHRIS - Chemical Hazard Response Information System
  - HSDB - Hazardous Substance Data Bank
  - IRIS - Integrated Risk Information System
  - NAERG - North American Emergency Response Guidebook Documents
  - New Jersey Hazardous Substance Fact Sheets
  - NIOSH Pocket Guide
  - OHM/TADS - Oil and Hazardous Materials/Technical Assistance Data System
  - RTECS - Registry of Toxic Effects of Chemical Substances
  - REPROTEXT System
  - REPROTOX System
  - TERIS - Teratogen Information System
  - 1st Medical Response Protocols
  - RegsLink with Federal Register.
  - LOLI – Lists of Lists

DOEHRS-DR SCHEDULE



QUESTIONS

CONCLUSION

The DOEHRS will provide accurate and complete Occupational and Environmental Health information by supplying automated data collection tools and comprehensive information access tools at deployed and fixed facilities worldwide.

DEFENSE OCCUPATIONAL HEALTH READINESS SYSTEM

Synopsis

The Defense Occupational Health Readiness System (DOHRS) is a Tri-Service occupational health (OH) system that will interface with Composite Health Care System II (CHCS II). An interface with the DoD Hazardous Substance Management System (HSMS) of the Defense Environmental Security Corporate Information Management (DESCIM) Program is also planned. DOHRS supports Hearing Conservation (HC), Industrial Hygiene (IH), and Occupational Medicine (OM) programs within the Military Health System (MHS). DOHRS assembles, compares, evaluates, and stores occupational personnel exposure information, baseline medical examination data, workplace environmental monitoring data, personal protective equipment usage data, observation of work practices data, and employee health hazard education data. DOHRS will be loaded on a shared server at each local site to create a data flow from local sites into a data warehouse located at the U.S. Army Center for Health Promotion and Preventive Medicine (CHPPM) for further Tri-Service analysis and archiving.

Benefits

DOHRS provides OH staff, command surgeons, and commanders with data and information that enhance their ability to select effective options for reducing health threats and conducting risk assessments. DOHRS will provide accurate and complete OH information by supplying automated data collection tools and comprehensive information access tools for the IH, OM, and HC functional areas at deployed and fixed Military Treatment Facilities (MTFs) worldwide.

DOHRS will enhance readiness by providing information to enable exposure based medical surveillance and enhanced IH risk reduction. Health care delivery will be improved through the elimination of unnecessary physical exams, clinical laboratory testing, and radiological procedures. Access to full exposure history will increase provider ability to determine possible causes of the illness or injury when individuals present at the clinic. DOHRS will improve the quality of OH care and wellness programs for the DoD workforce by promoting the equitable delivery of OH services and the development of more robust and informed prevention programs to minimize the impact of worksite hazards. Readiness benefits include reduced troop retraining due to partial disability and improved unit fitness through exposure life-cycle tracking.

Functions

IH module

- Provides the basis for exposure based medical surveillance
- Identifies, quantifies and documents pre-deployment, deployment, and post-deployment exposures
- Recommends primary prevention controls for identified hazards

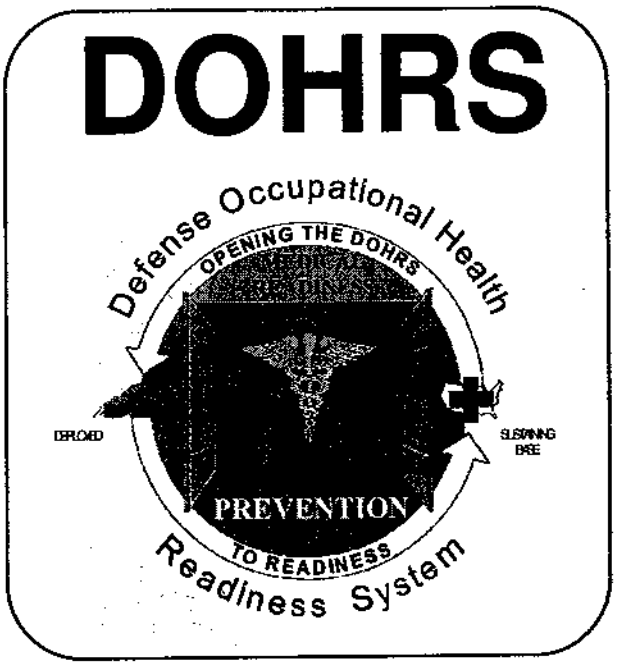
OM module

- Performs pre-assignment qualification
- Provides exposure based medical surveillance
- Treats and refers occupational illness and injury
- Documents medical outcomes

HC module

- Provides medical surveillance for noise exposed populations
- Identifies referrals for hearing loss illness and injury
- Documents auditory readiness status utilizing quantifiable metrics (H-Profiles and STS)

CHCS-II
COMPOSITE HEALTH CARE SYSTEM II



Defense Occupational Health Readiness System (DOHRS)

Mission Need Statement (MNS)

(Final)

20 February 1998

1. INTRODUCTION

This Mission Need Statement (MNS) describes the current occupational health (OH) environment within the Clinical Business Area (CBA) of the Office of the Assistant Secretary of Defense for Health Affairs (OASD[HA]). This MNS also documents a mission need to develop, deploy, and maintain the Defense Occupational Health Readiness System (DOHRS) automated information system (AIS). The DOHRS integration of Tri-Service OH information supports the Military Health System (MHS) priorities in both readiness and managed care arenas. It is a cost-effective replacement for the duplicative OH legacy systems that exist throughout the Services.

2. MISSION AREA

The DOHRS will provide information needed by occupational health staff and command surgeons to provide commanders with options for reducing health threats.

- The DOHRS will integrate occupational health information by providing automated support for the MHS Industrial Hygiene (IH), Occupational Medicine (OM), and Hearing Conservation programs at deployed and fixed facility health care treatment facilities worldwide.
- The DOHRS will provide individual longitudinal exposure records. Predeployment exposure records will allow use of individuals' own histories as baseline against new exposures on deployment and will facilitate postdeployment follow-up.
- The DOHRS program will also support health care demand management by enabling exposure based OM and IH interventions. Elimination of unnecessary patient loading at physical exam, clinical labs, and radiology will improve beneficiary access. This improvement fits well with the MHS Information Management/Information Technology (IM/IT) Program mission of sharing timely, accurate, and appropriate data or information between Medical Treatment Facility (MTF) Commanders, Industrial Site Commanders, Lead Agents, Installation Agencies, and other users of comprehensive OH information.

3. MISSION ELEMENT NEEDS

Eleven mission element needs have been identified by the policies, regulations, and requirements governing the DOHRS:

1. Identify prevention and intervention measures;
2. Contain occupation-related health hazard and risk information;
3. Maintain longitudinal occupational exposures records of Department of Defense (DoD) personnel;
4. Support health and safety training and education for DoD personnel;
5. Contain occupational illness surveillance data;
6. Contain results of trend analyses and epidemiological studies;
7. Identify compensation and disability costs;
8. Access worker demographic, operation, and location records;
9. Monitor Occupational Safety and Health Administration (OSHA) compliance;
10. Contain administrative planning and record keeping information; and
11. Track credentials and qualifications of IH and OM professional staff.

4. BASIS FOR NEED

The DOHRS Working Group has proposed the following objectives for the DOHRS Program:

- Use existing OH information, research, and technology for the benefit of all DoD-OH beneficiaries;
- Achieve and maintain a standard level of OH for all DoD personnel;
- Decrease the adverse effects of DoD operations upon the environment;
- Improve the management of all DoD OH-related activities; and
- Maintain the appropriate alignment between resources (e.g., human, materiel, financial, information) and requirements.

Achieving these objectives through the DOHRS requires a comprehensive AIS for assembling, comparing, using, evaluating, and storing personnel exposure information, baseline medical examination data, workplace environmental monitoring data, personal protective equipment usage data, observation of work practices data, and health hazard training and education data. The complexity and size of the OH programs at most installations make the use of an AIS, such as the DOHRS, a solution producing substantial benefits. In addition, the use of the DOHRS will prevent the development of nonuniform and incompatible local systems. Also, the DOHRS will function on two levels: it will provide local data to health care providers worldwide, and it will provide corporate level information that can be used by OASD(HA).

Fulfilling the objectives of the DOHRS will enhance the readiness of the U.S. military forces. The progress that a DoD-wide, integrated, AIS will make in the management and provision of OH will improve the readiness of U.S. military forces for combat and other operations while reducing waste and overall cost of operating OH facilities. Occupational Health Program services are an integral part of the MHS mission and vision and directly support the goals established by the OASD(HA) and the three Surgeons General in the MHS Strategic Plan.

5. CONCLUSION

A legitimate, operationally related, mission need exists to develop, deploy, and maintain the DOHRS. The DOHRS will integrate occupational health information across the Tri-Services in a manner that significantly improves both the readiness of U.S. military forces and the efficiency of OH operations.

APPENDIX: LIST OF ACRONYMS

AIS	Automated Information System
CBA	Clinical Business Area
DoD	Department of Defense
DOHRS	Defense Occupational Health Readiness System
IH	Industrial Hygiene
IM/IT	Information Management/Information Technology
MHS	Military Health System
MNS	Mission Need Statement
MTF	Medical Treatment Facility
OASD(HA)	Office of the Assistant Secretary of Defense for Health Affairs
OH	Occupational Health
OM	Occupational Medicine
OSHA	Occupational Safety and Health Administration

DOHRS Information

PROJECT MANAGEMENT OFFICE:

Mr. William (Bill) Monk is the DOHRS Project Manager, and MAJ Alex Ornstein is the Deputy Project Manager.

BACKGROUND:

Occupational Health (OH) programs within DoD are designed to comply with federal, DoD, and service specific laws, regulations, standards, executive orders, directives, and requirements that support the prevention of work-related illness and injury in DoD military members and civilian employees from exposure to chemical, biological, or physical hazards. In order to comply with existing guidance, each Service developed information systems and protocols to facilitate the OH activities specific to its operations and worksites. The uncoordinated development of parallel OH systems across Services led to large variations in design, scope, implementation, application, and documentation. To adhere to the MHS Information Management/Integration Technology (IM/IT) Strategic Plan, OH program managers across DoD were required to integrate and standardize the information and procedures associated with their OH business practices. To meet these requirements, the concept of DOHRS was proposed as an interim migration system, whereby the functionality of the Service-specific legacy system would be consolidated into a single, tri-Service OH information system.

OVERVIEW:

The Defense Occupational Health Readiness System (DOHRS) is an automated information system designed to support the Hearing Conservation (HC), Industrial Hygiene (IH), and Occupational Medicine (OM) programs within the Military Health System (MHS). The DOHRS will provide timely and efficient access of data and information to users throughout the Department of Defense (DoD) worldwide including Military Treatment Facility (MTF) commanders, industrial site commanders, lead agents, installation agencies, and other users of comprehensive occupational health information. The DOHRS will ultimately capture data on occupational exposures to personnel for transfer to the computerized patient record.

Federal legislative and executive polices (specifically, the Code of Federal Regulations, Title 29, Parts 1910 and 1916; and Executive Order 12196) require DoD compliance with Occupational Safety and Health Administration (OSHA) regulations to assure safe and healthful working conditions. Furthermore, DoD Instructions (DODI) 6055.1 and 6055.5 mandate that DoD establish and maintain an effective occupational safety and health program for all military and civilian employees. Service-specific regulations require the service's installations and activities to comply with these requirements for job-related medical surveillance and personal protection, hazard identification and assessment; and the prevention, or control, of occupational diseases or injuries. The Army regulations appear in Army Regulations (AR) 40-5, AR 385-10. The Air Force regulations appear in Air Force

Pamphlet (AFPAM) 48-133. The Navy regulations appear in the Chief of Naval Operations (CNO) series 5100 orders.

Tri-Service representation in the form of working groups, task forces, and user groups have been actively engaged in defining and prioritizing functional requirements and in the prioritization, design, development, and implementation of the DOHRS. The DoD will deploy DOHRS worldwide to military installations, depots, medical centers, medical department activities, and clinics. The Army Corps of Engineers, National Security Agency, Defense Logistics Agencies, and the National Guard will also utilize DOHRS.

The DOHRS Program Management Office manages the development and operational support for the Defense Occupational Health Readiness System.

CUSTOMER:

The DOHRS is being developed as a comprehensive, Tri-Service Automated Information System (AIS) for assembling, comparing, using, evaluating, and storing occupational personnel exposure information, baseline medical examination data, workplace environmental monitoring data, personal protective equipment usage data, observation of work practices data, and employee health hazard educational data throughout the DoD.

The DOHRS directly supports individuals from the HC, IH and OM functional areas as well as provides OH staff, command surgeons, and commanders with data and information that enhances their ability to select effective options for reducing health threats and conducting risk assessments. The DOHRS will provide accurate and complete OH information by supplying automated data collection tools and comprehensive information access tools for the IH, OM, and HC functional areas at deployed and fixed facility MTFs worldwide.

VISION STATEMENT:

Become the Leader for the Development, Maintenance, and Operational Support of Automated Occupational Health Information Systems within the Federal Government.

MISSION STATEMENT:

Improve the effectiveness of Occupational Health Programs through the use of Automated Information System Technology that includes the design, development, acquisition, testing, deployment, training and maintenance of an integrated system for effective information management.

Snail mail may be addressed to:

Commander
U.S. Army Center for Health Promotion
and Preventive Medicine
ATTN: DOHRS (Bldg. E-1645)
Aberdeen Proving Ground, MD 21010-5422.

or by phone at DSN 584-2926, Comm (410) 436-2926, FAX 584-1039;

STATUS OF DOHRS-HC

The Defense Occupational Health Readiness System, Hearing Conservation module (DOHRS-HC) consists of hardware and software which are used to conduct individual and group hearing tests. The system also generates DD2215 Reference Audiogram and DD2216 Hearing Conservation Data forms, and transmits test data via the internet to a central data warehouse. This audiometric database will allow in-depth local and central program review and epidemiological analysis. DOHRS-HC is vital to the Navy Hearing Conservation and the Navy Occupational Safety and Health Programs.

After numerous developmental delays and despite limited field testing, DOHRS-HC was deployed to Navy and Marine Corps shore stations in the summer of 1999, principally to replace existing instrumentation that was rapidly deteriorating and not Y2K compliant. Initial acceptance was poor, as the hardware and software were radically different from the systems they replaced. Several sites have overcome these obstacles and are very pleased with the system while many others continue to have significant difficulty.

An unexpected result from deploying DOHRS-HC has been the emergence of significant threshold shift (STS) rates on annual audiograms at far higher than historical levels. While 15% was a typical annual incidence of STS using pre-DOHRS instrumentation (based on personal experience and limited data analysis), many DOHRS-HC sites are reporting rates of 30-40%.

A NEHC audiologist has done a limited study at a Norfolk test center that indicated that DOHRS-HC thresholds were accurate and replicable. If the initial replicability results are confirmed by an expanded study now being scheduled, then an emerging explanation for the increase in STS is that previous microprocessor test methodologies did not adequately inhibit "guessing." The DOHRS-HC test takes a bit longer than previous systems, primarily due to the inclusion of several procedures specifically designed to reinforce test accuracy.

DOHRS-HC deployment to the Fleet has just begun. Fleet platforms with on-board audiometric test facilities are advised to contact the nearest medical treatment facility operational or occupational audiologist for assistance prior to attempting to set up and utilize their systems.

In summary, we are aware of no information to support a conclusion that DOHRS-HC provides invalid results. As system deployment and evaluation continue, we ask your continued support of this necessary evolution.

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Applied Occupational and Environmental Hygiene
Volume 16(2): 98–101, 2001
1047-322X/01 $12.00 + .00

IH Interface

A Software Application for Implementing an Effective Industrial Hygiene Program, Assisting with Exposure Assessment, and Validating Management Indicators and Performance Metrics

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Background

The Defense Occupational and Environmental Health Readiness System–Industrial Hygiene (DOEHRS–IH) Application is the U.S. Department of Defense (DoD) corporate standard for industrial hygiene management software.[1,2] The mission's essential data elements pertain to facilities, worksites, organizations, surveys, hazards, controls, workers, exposure monitoring, instrumentation, calibration, and resources. The software applies the recommendations of the Joint American Conference of Governmental Industrial Hygienists–American Industrial Hygiene Association (ACGIH–AIHA) Task Group on Occupational Exposure Databases;[3] incorporates the guidance of several DoD user advisory groups, task forces, and working groups;[1,2] and complies with the DoD industrial hygiene exposure assessment model.[4] This article explores how the DOEHRS-IH application helps industrial hygiene professionals achieve the goals of implementing effective industrial hygiene programs, assisting with exposure assessment, and validating management indicators and performance metrics.

Discussion

Goal 1: Implementing an Effective Industrial Hygiene Program

The DOEHRS-IH Application provides data that enable industrial hygiene management professionals to develop planned approaches to implementing effective programs. The software contains the necessary information to design a flexible workplace-monitoring plan—a valuable tool to assist program managers in the systematic accomplishment of required services. Program managers use risk assessment, health effects, qualitative exposure, and exposure acceptability data, combined with human and economic resource availability, to distribute workload and schedule the qualitative evaluation and quantitative monitoring of health hazards.

Risk assessment. The industrial hygiene professional uses expertise, judgment, sampling data (if available), and a 4 × 4, two-dimensional decision matrix to assign a risk assessment code (RAC) to each hazard evaluated. An RAC quantifies the occupational health risk associated with a particular hazard and prioritizes each hazard for abatement funding. The DoD RAC system consists of five categories:[5]

- Critical
- Serious
- Moderate
- Minor
- Negligible

The Safety and Musculoskeletal RAC is described in terms of hazard severity and accident probability. The Health Hazard RAC is an expression of health hazard severity (i.e., exposure levels, exposure routes, and potential medical effects) and mishap probability (i.e., exposure frequency, exposure duration, and number of potentially exposed personnel).

Health effects. The industrial hygiene professional assigns a health effect rating (HER) to each identified hazard. The HER system consists of five categories:[1,6]

- Serious (i.e., death; carcinogenesis [known or suspected, animal or human]; mutagenesis; asphyxia; anoxia/hypoxia; hematologic disturbances [e.g., anemia, methemoglobinemia]; respiratory sensitization [e.g., asthma])
- High (i.e., disabling injury or illness; permanent central nervous system damage; pulmonary edema; cardiac arrhythmia; reproductive effects [e.g., teratogenesis]; chronic/long-term organ toxicity [e.g., cumulative lung damage]; acute/short-term high-risk effects)
- Elevated (i.e., severe, reversible and/or irreversible health effects; nervous system effects [e.g., cholinesterase inhibition] other than narcosis; acute/short-term effects; elevated irritation of eyes, nose, throat, or skin)
- Moderate (i.e., reversible health effects; narcosis; moderate irritation of eyes, nose, throat, and/or skin)

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- Low (i.e., reversible health effects of little concern; no known or suspected adverse health effects)

Qualitative exposure. The industrial hygiene professional assigns a qualitative exposure rating (QER) to each identified hazard. The QER system consists of four categories:[1,6]

- Very high (i.e., frequent contact with the potential hazard at very high concentrations; frequently can expect the exposure to meet or exceed 100 percent of the occupational exposure limit [OEL])
- High (i.e., frequent contact with the potential hazard at high concentrations, or infrequent contact with the potential hazard at very high concentrations; frequently can expect the exposure to meet or exceed 50 percent of the OEL, but less than 100 percent of the OEL, or infrequently can expect the exposure to meet or exceed 100 percent of the OEL)
- Moderate (i.e., frequent contact with the potential hazard at moderate concentrations, or infrequent contact with the potential hazard at high concentrations; frequently can expect the exposure to meet or exceed 10 percent of the OEL, but less than 50 percent of the OEL, or infrequently can expect the exposure to meet or exceed 50 percent of the OEL, but less than 100 percent of the OEL)
- Low (i.e., frequent contact with the potential hazard at low concentrations, or infrequent contact with the potential hazard at moderate concentrations; frequently can expect the exposure to be less than 10 percent of the OEL, or infrequently can expect the exposure to meet or exceed 10 percent of the OEL, but less than 50 percent of the OEL)

Exposure acceptability. The industrial hygiene professional uses expertise, judgment, and sampling data (if available) to assess workplace exposure levels and assigns an exposure potential category (EPC) to each identified hazard. The EPC summarizes the industrial hygiene exposure assessment and helps the occupational health provider determine the appropriate, exposure-based medical surveillance. The EPC system consists of three categories:[1,7]

- Acceptable exposure
- Unacceptable exposure
- Uncertain exposure (i.e., additional assessment necessary; further information gathering required)

Goal 2: Assisting with Exposure Assessment

The software assists users with developing and refining exposure assessment strategies, and facilitates the analysis and interpretation of exposure data and information for risk assessment and hazard abatement purposes. In compliance with the DoD industrial hygiene exposure assessment model,[4] and the AIHA exposure assessment strategies consensus document,[7] the application helps each user (1) to anticipate, identify, characterize, assess, and control potential exposures; (2) to establish and refine similar exposure groups (SEGs); and (3) to record, report, and periodically re-evaluate survey data. This comprehensive occupational exposure database allows quick identification of uncontrolled workplace hazards, delineation of required control measures, and evaluation of corrective hazard abatement actions. The database information aids in the prioritization of worksites and operations that require corrective action funding. Examples of corrective action include, but are not limited to, substitution of materials or processes, design and implementation of engineering controls, administrative controls (e.g., limiting the amount of daily operation time), and personal protective clothing and equipment.

The DoD industrial hygiene exposure assessment model follows an eight-step business process patterned after several references,[5,7–20] most notably the AIHA exposure assessment strategies consensus document. The process includes:[4]

- Defining scope of support and resources
- Basic characterizing
- Establishing SEGs
- Developing a workplace monitoring plan
- Characterizing exposures
- Providing a control plan
- Reporting and recording, and
- Re-evaluating

The foundation lies in the SEG concept. Simply put, an SEG is any group of people who experience exposures similar enough so that assessing the exposures of any member of the group is predictive of exposures of all members of the group. Industrial hygiene professionals define and establish SEGs by organization, process (or task) being performed, event (or situation), job series (or title), and geographic exposure location. Defined in the AIHA exposure assessment strategies consensus document,[7] the term "SEG" replaces the outdated term "Homogeneous Exposure Group (HEG)."[6]

The SEG concept is a critical element of detailed workplace exposure assessments. SEGs represent groups of employees who have common risks and similar exposure profiles that are identified by similar substance, workplace, and exposure factors (e.g., contaminants, organizations, worksites, job titles, processes or tasks, and exposure levels). SEG definition, identification, and refinement involves identifying a group of similarly exposed workers, sampling members of the group, calculating statistics from the individuals sampled within the group, and then assigning the exposure statistics (i.e., personal sampling data and group exposure statistics) to all members of the particular SEG.

Goal 3: Validating Management Indicators and Performance Metrics

Management indicators and performance metrics facilitate the assessment,

benchmarking, and continuous improvement (i.e., a combination of incremental improvement and business process reengineering) of industrial hygiene programs. Users apply indicators and metrics for measuring program effectiveness (i.e., doing the right things correctly) and efficiency (i.e., doing the right things quickly). Managers target individual program elements that require improvement and apply scoring criteria to several weighted management indicators to evaluate the overall status of their program. Industrial hygiene professionals target individual program elements that require improvement; provide consistent, factual, performance-based assessments of their programs; document program accomplishments; develop program-specific improvement strategies; identify specific issues requiring action; and provide requirement-based manpower and budget information to decision-makers.[1,21–23]

Periodic statistical process control can be conducted monthly, quarterly, and annually to analyze trends, investigate problems, draw conclusions, and recommend improvements. Statistical process control charts provide graphical representation of results, depict shifts in process performance, show effects of process changes (e.g., modifications, innovations), answer "what if . . . ?" scenarios (e.g., measure the potential impact of a reduction in an occupational exposure limit), and distinguish between the variation inherent in a process and the variation arising from unpredictable sources.

Normal random variation is present in any system, even when the system is in control. A control chart is a time plot that indicates the range of variation built into the system by denoting the upper control limit (UCL) and the lower control limit (LCL). The UCL equals the arithmetic mean plus three standard deviations; the LCL equals the arithmetic mean minus three standard deviations. Data points that stay within the control limits indicate that most of the variation arises from common causes. However, data points that fall beyond the control limits or into particular patterns indicate special causes that deserve investigation.[24]

Conclusions

The DOEHRS-IH application provides data to develop planned approaches to implementing effective programs and designing flexible workplace-monitoring plans. The software provides occupational health professionals with data that facilitate the assignment of appropriate, exposure-based medical surveillance. This comprehensive occupational exposure database assists users with developing and refining SEGs and exposure assessment strategies and facilitates the analysis and interpretation of exposure data and information for risk assessment and hazard abatement purposes. The system provides decision-makers with the key information required to rapidly identify the strengths, weaknesses, and contributions of an industrial hygiene program. The software provides a consistent, performance-based program assessment; documents program accomplishments and improvement strategies; identifies issues requiring action; and examines resource utilization. Management indicators and performance metrics facilitate the assessment, benchmarking, and improvement of industrial hygiene programs. Users apply indicators and metrics for measuring program effectiveness and efficiency. Future plans include revising the current scoring criteria; incorporating additional desirable indicators and metrics identified by user advisory groups, task forces, and working groups; and using program performance to provide increased visibility to the DoD leadership.

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