USACHPPM TODAY

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USACHPPM supports protecting the health of our deployed forces.

USACHPPM TODAY

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CORPORATE MANAGEMENT INFORMATION SYSTEM

By: Mr. Stephen L. Kistner

In addition to our highly specialized consultative role, USACHPPM is an organization that handles complex, long-term health associated issues (e.g., depleted uranium, pyristigmine bromide, medical surveillance). Our ability to determine and be responsive to customer requirements for such projects will require a more sophisticated, activity-based costing and project management culture within the Center. USACHPPM's Corporate Management Information System (CMIS) is a tool that is being developed for the purpose of creating a world-class competitive organization by improving the effectiveness and efficiency of how we do business. The Center will need to combine key business processes, tools/software applications, and data necessary to enhance our organizational capabilities.

The Center's vision for CMIS is to implement a standard set of corporate processes that enables users to improve the quality of their decision-making in order to deliver products and services that meet or exceed customer expectations. Our goals for the CMIS are to:

- Enter and retrieve information in a timely and efficient manner through a single standardized portal/interface.
- Facilitate users to make informed and effective decisions.
- Improve the quality and efficiency of how we work.
- Implement a knowledge management focus within the organization.
- Ensure continuous quality improvement.
- Maximize customer satisfaction.
- Provide flexible solutions to address future requirements.
- Support corporate, metric-based analysis of outcomes and performance.
- Shift from individual knowledge (intellectual property) to organizational knowledge.
- Ensure the System monitors and validates data integrity across the Center.

In 1998, a CMIS-Quality Management Board (QMB), representative of all USACHPPM, was established to gather, validate, and prioritize the knowledge management requirements needed to implement solutions that will fit within a corporate framework. Any requirements concerning personnel data, projects, or financial management information within the Center will be reviewed by the QMB. In order to complete such an enormous undertaking, the CMIS-QMB identified seven major phases as a roadmap for accomplishing a fully functional management information system. See Figure 1 for these phases.

In July 1999, USACHPPM contracted with Cambridge Technology Partners in a two-week scoping project to examine our business requirements and to determine the breadth of CMIS throughout the Center. This project analyzed USACHPPM's current business processes and identified, prioritized, and planned (for implementation) the functionality required to enable the Center to realize its vision of the CMIS. This team identified our business challenges:

- Retain our competitive edge.
- Ensure consistency of data/process within the organization.
- Share data/process within the organization.
- Prioritize and redirect resources.
- Meet customer expectations.
- Keep a consistent focus on cost control.
- Ensure accountability of investment.
- Ensure justification of investment.
- Ensure external regulatory requirements.

CMIS Project Phases

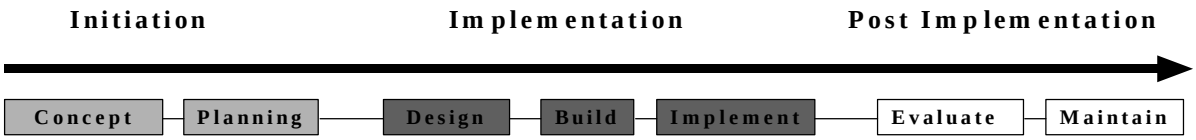


Figure 1

As a result of this scoping project, the CMIS-QMB established work groups, comprised of USACHPPM personnel, to define the following business processes so that we will know what data to collect in order to manage our organization:

- Financial Process Management (Budget Planning and Budget Management).
- Project Management.
- Document and Technical Information Management.
- Personnel Management.

A Laboratory Information Management Work Group defined its process flow in a separate initiative. A simplistic flow diagram of how such process information interacts is presented in Figure 2.

Financial Process Management: This process highlights USACHPPM's ability to develop the budget and manage all resources involved in projects (e.g., labor, contracts, logistics, travel, training). The Financial Process Analysis Work Group (FPAWG) has been established to determine if USACHPPM's in-house staff can identify/ develop organization-wide financial manage-

Business Processes

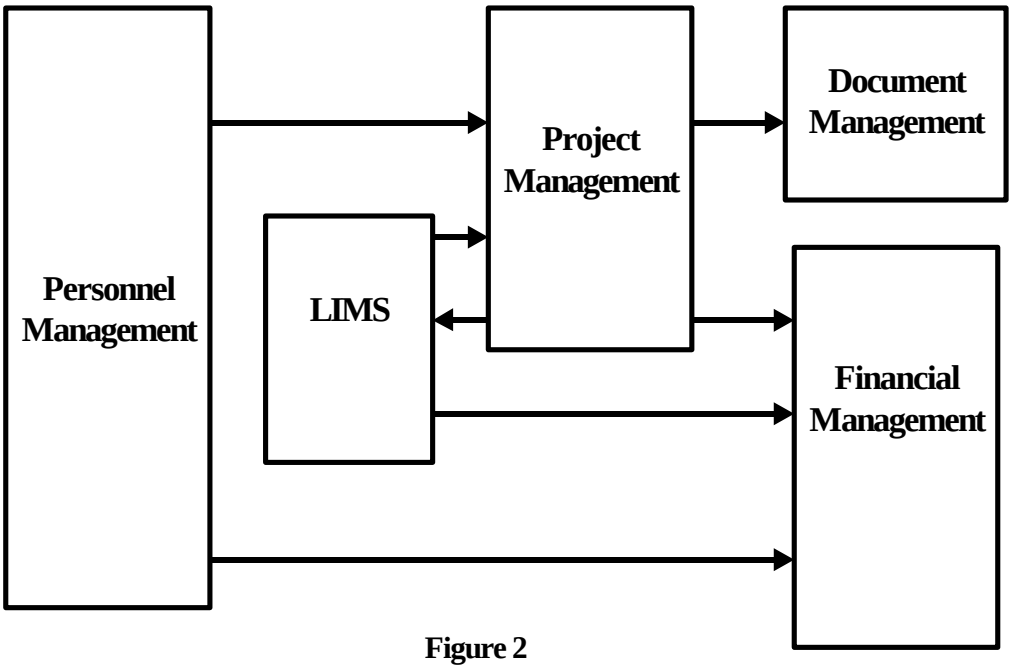


Figure 2

ment processes for follow-on automation design in the CMIS project plan. For their first initiative, the FPAWG dealt with the timekeeping process and how personnel time is spent on projects and programs by capturing and tracking labor hours. The FPAWG is also reviewing existing processes and automation tools in use both internal and external to USACHPPM as potential solutions for capturing financial management information throughout our entire organization.

Project Management: Three elements were identified during the scoping project: (1) Project Planning addresses planning project costs or funding, monitoring the status or progress of projects, ensuring quality control, and identifying the deliverable or outcome of projects; (2) Project Tracking addresses how new and existing programs/projects are monitored; (3) Project Closure evaluates areas such as project performance, project costs, duration, resources, significant issues, quality assurance, customer satisfaction, variance, outcome, strategic planning and policy implications. The Project Management Work Group (PMWG) has been established to determine if USACHPPM's in-house staff can identify and develop project management processes (e.g., standing operating procedures, protocols) for follow-on automation design. The PMWG will analyze Project Management functions to include localized processes and automation tools currently in use, external data systems interfacing with USACHPPM, and the Directorate of Occupational Health Sciences Management Information System.

Document Management: This process identifies those steps in the production, review, dissemination, and archiving of project documents and information. The initial effort of the Document Management Work Group (DMWG) has focused on the review and selection of a medium to store and retrieve any documents concerning command-wide information (e.g., technical reports, memorandums, meeting minutes). The DMWG will also describe tracking the life cycle of a document (cradle-to-grave process). It will determine the methods and software to be used for tracking USACHPPM documents, will determine document processes currently in use within USACHPPM, will determine level of access to current and future storage of documents or information of historical value, and will determine how long documents will be kept and where documents will be stored.

Personnel Management: This process captures pertinent information for active and reserve military personnel, civilian employees, professional associates, and other contractors. The Personnel Database Oversight Work Group has been established to coordinate and provide the CMIS-QMB information in the development of a single personnel database. This database will incorporate all personnel data relating to computer accounts, elec-

tronic mail boxes, telephone information, and page numbers, as well as day-to-day operational information requirements.

Laboratory Information Management: This process will interface with the Laboratory Information Management System (LIMS). There are three areas associated with the LIMS: (1) Track samples for monitoring purposes to aid in providing customers on-time results and for generating report ready data tables; (2) Data reservoir to serve as a database container for all analytical data; and (3) Management information to assist in determining scheduling, determining backlog, tracking performance of the laboratory in meeting requirements of customer, tracking turn-around-time, and providing cost quotes and invoices.

The essence of USACHPPM is our technical expertise. The information and knowledge utilized in the delivery of our products and services to numerous customers around the world needs to be readily available and consistently applied in the solution of public health problems and the sustainment of a healthy force. A pragmatic management information system within USACHPPM would allow us to act strategically to make critical decisions based on factual information. Furthermore, it is essential for us to capture the institutional expertise of our people to continue to evolve "corporate knowledge" into the future . . .

- By capturing activity-based cost issues.
- By being able to readily retrieve technical documents, references, and scientific data.
- By sharing knowledge and information.
- By improving the quality and efficiency of how we work.
- By maximizing customer satisfaction.
- By supporting corporate, metric-based analysis of outcomes and performance.

If we ensure that CMIS monitors and validates data integrity across the Center, we will manage our organization more effectively. We will move toward our vision of being a world class center of excellence, and continue to be an essential element, not only within the Army Medical Department, but for the entire Army and Department of Defense.

USACHPPM PERSONNEL

MASTER CONSULTANT
JOSEPH J. KNAPIK, MS, ScD

Dr. Joseph J. Knapik, Research Physiologist, Directorate of Epidemiology and Disease Surveillance, was honored at the Master Consultant Award Ceremony on 15 October. The Master Consultant program was established in 1989 to designate those employees who have been recognized within the Army, the nation, and in some cases internationally, as outstanding scientific and technical professionals. Because of their foremost ability and performance, they are regularly chosen for the most difficult and challenging assignments.

Dr. Knapik was recognized for his sustained high-level contributions and personal impact in the highly specialized areas of injuries, health, fitness, and performance. Significant contributions include the following major studies: Entry-level physical fitness among basic combat trainees and effect on trainee's subsequent injury risk and lifting capability. Incidence of injuries and associated risk factors among medical, infantry, combat engineer, and artillery personnel. Effect of cognitive, psychological, and physical functions on the soldier's performance during sustained military operations. Efficacy of socks and antiperspirant use on reducing incidence of foot blisters during road marching. Evaluation of the influence and effectiveness of physical training programs on the health and fitness of light infantry and senior Army officers. Physiological studies of work capacity and muscle strength among military personnel.

Dr. Knapik has written 32 Government reports and 53 publications in the open-peer-reviewed literature, reviewed 5 military technical and field manuals, published 17 book chapters and conference proceeding papers, and participated in 58 scientific and military presentations. Highlighting his career, he was one of five U.S. military experts to testify before a Congressional Committee investigating gender-related issues in military training.

Dr. Knapik lives with his wife, Laura, in Carlisle, Pennsylvania. They enjoy winter mountaineering, hiking, and bicycling together. Dr. Knapik is an avid homebrewer, woodworker, naturalist, and amateur radio enthusiast.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM) AWARD OF MERIT

Mr. Keith B. Hoddinott, senior environmental scientist, Environmental Health Risk Assessment and Risk Communication Program, received a 1999 ASTM Award of Merit from ASTM Committee D-18 on Soil and Rock. The title of Fellow accompanies the award, which is the highest Society award granted to an individual member for distinguished service and outstanding participation in ASTM technical committee activities. Hoddinott was cited for outstanding service in leading Committee D-18 into soil analysis and risk assessment through standards development and symposia.

Hoddinott has been a member of ASTM since 1982. He is the current chairman of Dl8.14.02 Task Group on Health and Safety Considerations of Waste Management, D18.22 on Plant Growth, and a member-at-large of D18.90, the Executive Subcommittee. He has been the past chair for D18.06 on Physio-Chemical Properties of Soil from 1987 to 1993 and since 1997 is the acting chairman of this subcommittee. He served as the chairman of D18.06.01 Task Group on Plant Growth from 1989 to 1992. His technical contributions to D-18's work include his organizing and editing of seven symposia and primary author for a number of standards. Through his significant contributions to the work of D-18 in plant growth and risk assessment, Hoddinott has led Committee D-18 into new activities with significant benefits to society.

Committee D-18 is one of 130 ASTM technical standards-writing committees. Organized in 1898, ASTM is one of the largest voluntary standards development organizations in the world. Outside of ASTM, Hoddinott is a member of the American Society of Agronomy, and the Soil Science Society of America.

He has been with USACHPPM since 1981. His responsibilities are to determine the impact of military activities of human health and the quality of the environment. This includes identifying and interpreting the behavior of chemicals in the natural environment. He also serves as the representative of the Office of the Surgeon General as the liaison to national and local scientific organizations as well as his attendance at technical and public meetings. He received his B.S. degree in soil and plant science in 1977 from the University of Connecticut. He continued his education at Cornell University where he received his M.S. degree in soil science with a minor in sanitary engineering in 1980.

EITZEN WINS FEDERAL WOMEN'S PROGRAM AWARD

Colonel Joan P. Eitzen received the Aberdeen Proving Ground Federal Women's Program's Supervisor/Manager of the Year award at ceremonies on August 24. The award was presented by MG John C. Doesburg, Commander, APG.

The former Director of Health Promotion and Wellness was cited for her work in building the fastest growing directorate in USACHPPM. During her two-year tenure, she doubled her staff, of which 67 percent are females in professional positions. She was requested by the Army's Office of the Surgeon General and U.S. Army Medical Command to lead a Process Action Team to develop recommendations regarding the quantity and quality of care available to active duty women. This Well Women Report has been presented to the Defense Advisory Council of Women in the Services. She also has a history of recommending and mentoring women for traditional education resources, long-term training, and developmental assignments.

Eitzen became involved in Harford County's ***Kids Can*** Program, and was a mentor to a Baylor intern student (an Army captain at USACHPPM) and a girl at the Edgewood Middle School. She was so impressed with her experience that she recruited 25 women from USACHPPM to participate in the Edgewood Middle School mentoring program.

She received a nursing diploma in 1975, a bachelor 's degree in nursing in 1978, a master of public health degree in 1989, a master of social work degree in 1989, a master of military art and science degree in 1991, and a doctor of philosophy degree in 1996.

(l to r) MG John C. Doesburg, APG Commander, and COL Eitzen.

Her military awards include four Meritorious Service Medals, two Army Commendation Medals, the National Defense Service Medal, the Armed Forces Reserve Medal, the Humanitarian Service Medal, and the Oversees Service Ribbon.

Eitzen is presently attending the Army War College, Carlisle, PA.

EXPERT FIELD MEDICAL BADGE

2LT Brian Smith, USACHPPM-North Field Preventive Medicine Division, successfully completed the coveted Expert Field Medical Badge training and testing at Fort Bragg, NC, 26 September. (POC: MAJ Thomas, DSN 923-6502, ext. 226)

TRAINING TOMORROW'S PREVENTIVE MEDICINE LEADERS

The Institute of Medicine's landmark study, *The Future of Public Health*, made abundantly clear that the training of tomorrow's public health leaders cannot be left to chance. The USACHPPM expresses this same sense of purpose and urgency through its Professional Medical Education Program (PMEP), currently managed by LTC Loren Erickson. Through the PMEP, the USACHPPM manages two graduate medical education programs: The General Preventive Medicine Residency located at Walter Reed Army Institute of Research (WRAIR) and the Occupational and Environmental Medicine Residency located at the Uniformed Services University of the Health Sciences (USUHS). Together, these two residencies account for over two-thirds of the preventive medicine and occupational and environmental medicine physicians trained for Army service.

Following the completion of a clinical internship at one of the Army's medical centers, resident physicians complete a Master of Public Health (MPH) degree (generally at USUHS, Johns Hopkins, or Harvard University). With the completion of the MPH, they participate in a one-year practicum at either WRAIR or USUHS where they work to master specialty and military-specific competencies through a series of rotations and special research projects. Both of these residencies are highly regarded nationally and are fully accredited for five years by the prestigious Accreditation Council of Graduate Medical Education. Last year's residents distinguished themselves by sweeping the awards at the annual meeting of the American College of Preventive Medicine in Washington D.C

For more information about these training programs, please contact:

LTC James Madsen, 301-295-9754 or DSN 295-9764, jmadsen@usuhs.mil http://www.usuhs.mil/pmb/prevmed.html or

LTC R. Loren Erickson, 202-782-1300/1362 or DSN 662-1300/1362, Loren.Erickson@na.amedd.army.mil http://wrair-www.army.mil/Depts/PrevMed/pmgpmr.htm

NEW DOD HEARING CONSERVATION MEDICAL EXPENSE PERFORMANCE REPORTING SYSTEM (MEPRS)/AMBULATORY DATA SYSTEM (ADS) CODES

Effective October 1, the first standard MEPRS/ADS codes for an Occupational Health/Preventive Medicine Program will be implemented to characterize Hearing Conservation Program activities at over 400 DOD medical treatment facilities. Through the DOD Hearing Conservation Working Group, Major Kathy Gates, formerly of USACHPPM, and Ms. Jane Cunningham, MEPRS project office at the Bureau of Naval Medicine, have performed lead roles in the effort to develop these coding standards and to bring about vastly improved data quality for the MEPRS. Dr. Tom Helfer, also at USACHPPM, performed a key role in the standards developed for the ADS. These standards will allow for the first time ever a reliable accounting of Hearing Conservation Program costs, outcomes, and a more equitable allocation of resources to accomplish the hearing conservation mission throughout DOD. Such standards should prove an invaluable management tool for the senior leadership role in resource advocacy. POC: Dr. Doug Ohlin, DSN 584-3797, 410-436-3797, or 1-800-222-9698.

WISE EARS

Wise Ears is a national coalition of Government agencies, public organizations, businesses, industries and unions recently formed to prevent noise-induced hearing loss. Cost savings/cost avoidance outcomes realized through the Army's Hearing Conservation Program are cited in the coalition's promotional literature. In addition, USACHPPM is cited as one of 44 coalition members. For more information visit: www.nih.gov/nidcd/health/wise POC: Dr. Ohlin, DSN 584-3797, 410-436-3797, or 1-800-222-9698.

ENVIRONMENTAL NOISE- ANOTHER USACHPPM FIRST

Over the past 30 years, organizations supporting Federal Aviation Administration and DOD environmental noise mitigation programs have published thousands of noise contour maps for civilian and military airfields. Up until June 1999, however, no one had produced a noise map for troops during deployment. The Environmental Noise Program broke that barrier with a noise contour map for Rinas Airfield, Tirana, Albania.

Typically, civilian planners use noise contour maps to site residential areas away from high noise areas around civilian and military airports. Also, installation master planners use the maps to site military family housing, schools, churches, and hospitals. Noise contour maps also find their way into Environmental Assessments and Environmental Impact Statements.

At Rinas Airfield, planners had no choice but to billet troops in the vicinity of the runway. Although aircraft noise was not intense enough to damage hearing, it was intense enough to interfere with speech communication, mental concentration, and sleep. Since all troop quarters were inside the airfield boundary, there was no way to achieve complete quiet. The best that could be done was to find the quietest places for the most noise-sensitive uses, particularly sleeping areas. NOISEMAP, a computer package maintained by the U.S. Air Force since the 1970s, is an ideal tool for finding the quietest and noisiest places around airfields.

The NOISEMAP operator enters data on flight tracks, altitudes, types, numbers, and flight parameters of all the aircraft, and NOISEMAP prints a map showing the daily "noise dose" around the airfield. NOISEMAP operates on a database for all U.S. military aircraft. At Rinas Airfield, however, a team from USACHPPM discovered that the noisiest aircraft were not in the database. These were Russian-built transport planes. To solve this problem, USACHPPM-Europe's project officer, COL David Chandler, measured the sideline noise of aircraft already in the database and of aircraft not in the database. The NOISEMAP operator, Ms. Kristy Broska at USACHPPM-Main, used these comparisons to find the closest U.S. substitute for the foreign aircraft.

COL Chandler also collected all the operational data needed to run the NOISEMAP software, and he conducted noise dosimetry in noise-sensitive areas. The noise dosimetry served two purposes. First, it let the Hearing Conservation Program know whether there were hearing-hazardous exposures. Second, it gave the Environmental Noise Program a quality control check on the accuracy of the NOISEMAP output.

Orchestrating the teamwork among USACHPPM-Europe, Hearing Conservation Program, and Environmental Noise Program was the Deployment Environmental Surveillance Program under Mr. John Resta. This group also provided the secure facilities required for the effort.

Although the situation at Rinas Airfield was unusual, it is not an isolated example. A paper given by the Environmental Noise Program Manager, Dr. George Luz, at the August 1998 Army Force Health Protection Conference noted other examples of noise-related stress related to deployment. Of particular concern is sleep disturbance, since accidents, including friendly-fire accidents, are more likely to occur among fatigued soldiers. Lessons learned from the Rinas Airfield assessment are being incorporated into future support to deployment. POC: Dr. George Luz, DSN 584-3829, 410-436-3829, or 1-800-222-9698.

SUPPORTING THE NATIONAL SECURITY AGENCY (NSA)

Geologists, engineers, and engineering technicians from USACHPPM-Main and USACHPPM-North conducted a yearlong ground-water consultation at NSA.

During April 1998, a ground-water monitoring well inventory was conducted to determine the number and condition of monitoring wells at the NSA. The existing monitoring well network had been installed over a span of many years to investigate and monitor individual sites across the campus. Historical documentation was reviewed to determine the types of contamination encountered at each site and physical monitoring well locations. Thirty-seven monitoring wells and monitoring pipes were identified and inspected during the first-phase evaluation. The inspection included the overall condition of the monitoring wells, including the casing, well seal, protective casing, well designation, locks, proper location on a site map, depth to water, and the total well depth. Fifteen new monitoring wells were installed during the second phase of the consultation. The team consolidated existing and new monitoring well records, developed a comprehensive ground-water flow map, and sampled 33 ground-water-monitoring wells for ground-water quality. This project was accomplished with a cost avoidance of $50,000. POC: Ms. Donna J. Kutchey, DSN 584-2024, 410-436-2024, or 1-800-222-9698.

DEDS

THE ATLAS OF INJURIES IN THE U.S. ARMED FORCES

The DOD Injury Surveillance and Prevention Working Group's report, *The Atlas of Injuries in the U.S. Armed Forces*, was released as a supplement to the August issue of *Military Medicine*. Casualty, disability, safety, hospitalization, and research data are presented in a series of graphs and tables, providing an overview of injuries in the military for a 15-year period. This is the first document to provide such a comprehensive summary of available data for all four military services. Editors include Dr. Bruce Jones (COL, USA, retired), formerly of USACHPPM; LTC Paul Amoroso, U.S. Army Research Institute of Environmental Medicine; and Ms. Michelle Canham, USACHPPM. To request a copy, contact Ms. Michelle Canham-Chervak, DSN 584-1377, 410-436-1377, or mchervak@apg.amedd.army.mil.

COMPREHENSIVE MILITARY MEDICAL SURVEILLANCE

Comprehensive Military Medical Surveillance (CMMS) is a developing capability in support of DOD's Force Health Protection goals.

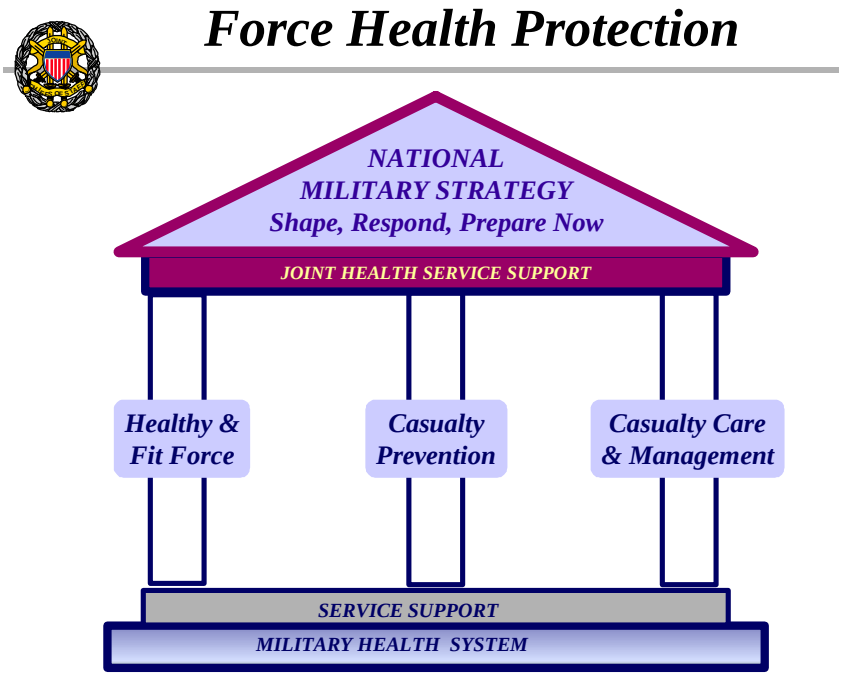
FORCE HEALTH PROTECTION (FHP)

Whether engaged in conflict against well-armed foes, participating in any operation other than war, or training in garrison, commanders are concerned about threats to the success of the mission. Mission success with today's smaller force on a much more technologically sophisticated and dispersed battlefield demands that each soldier remains able to perform his or her duty without impairment. Although commanders have always been concerned about the well being of their troops, commanders today are increasingly concerned about the health threats their personnel face and the ways to prevent, or at least minimize, these threats. The medical departments of the Services play the leading roles in addressing these concerns.

In anticipation of the future challenges for military medicine, the Services and the Joint Staff developed the strategy designated as FHP. Force Health Protection, as illustrated in Figure 1, has three fundamental goals for joint health service support: to provide a healthy and fit force to the Combatant Commanders, prevent diseases and non-battle injuries (DNBI), and to tend to the wounded and ill with state-of-the-art health care. Many of the details of execution of this strategy remain to be defined, but three major components are:

- Protection-assurance that troops are healthy and fit for deployment, fully immunized, trained to sustain themselves in hostile environments that include stress, naturally occurring diseases, and environmental threats.
- Monitoring-adequate documentation, analysis, and archival of critical information on individual health status, health care, and health risk factors over time.
- Management-efficient, timely, and accessible health care, including appropriate preventive services, forward-deployed surgical capability, robust medical evacuation, among others.

Figure 1.



Each component encompasses a broad range of skills, capabilities and specialties, and each deserves detailed explanation and discussion. For the remainder of this article, I will be focusing on the "monitoring" function, which includes medical surveillance.

Gulf War Consequence

One reason to monitor the health of the troops is to equip commanders with information needed to identify and neutralize troop health threats. The limited ability of DOD to produce valid and timely data to address health concerns of veterans of the Gulf War (1990-1) reinforced the need for improvements in the area of medical surveillance.

DOD Directive 6490.2, *Joint Medical Surveillance* (August 1997) directs the Combatant Commanders and Services to collect, analyze, and disseminate information in four areas:

(1) Health status of troop populations before, during, and after major deployments.
(2) Health threats they may face.
(3) Preventive measures required to counter the threats.
(4) Diseases and injuries that result.

Medical surveillance is also a component of "medical situational awareness"; one of four medical technological capabilities identified by the "AMEDD After Next '98" war game as critical for support of the future Army.

COMPREHENSIVE MILITARY MEDICAL SURVEILLANCE

For purposes of this discussion, the definition of "medical surveillance" will be that generally used by the public health community and applied in the DOD Directive: the timely, routine, and systematic collection and analysis of pertinent health information on a defined population and dissemination of this information to those who need to know. (For this paper, the term is *not* intended just to describe the targeted medical screening offered to workers based on work site exposures.) Military medical surveillance is conducted to reduce or prevent illness and injury, and targeted to assist commanders and other decision-makers. Comprehensive military medical surveillance emphasizes the population-based approach, in support of decisions concerning the health of specific groups of DOD personnel.

Concept for CMMS

CMMS is a DOD capability to provide timely information at the tactical, operational, and strategic levels. This information covers a broad range of indicators of health in populations of interest unique to DOD (active duty, civilian workforce, etc). Some of these health indicators are listed below.

- Population factors, including demographic risk factors (age, sex, and military occupation).
- Potentially hazardous exposures (including workplace and deployment-related exposures).

- Use of protective measures and equipment (immunizations, personal protective equipment).
- Personal risk factors (smoking, alcohol use, stress, pre- and post-deployment questionnaires, etc.).
- Health outcomes (injury, illness, sentinel health events).
- Clinical screening (occupational "medical surveillance").

Tactical and operational levels

Medical surveillance is a function of health service support at all echelons. At the tactical level, each medical officer must be aware of the health status of the troops for which he or she is responsible and the health threats they face, and assist the unit commander in addressing those threats. At the operational level, command surgeons and commanders must know the status of all subordinate units. This requires knowledge of rates and trends of illness and injury, as well as the current estimate of the health threat. Information on current health and threat conditions throughout the force is used to assist health care providers in diagnosing and treating patients appropriately. This capability must be available throughout the life cycle of the service member, in garrison as well as during any deployment.

Strategic level

Relevant data elements are integrated and analyzed in order to provide population-based information at the corporate level to support policy decisions. A major product of this effort is the construction of a series of related "accession though retirement" databases on the DOD populations of interest.

A concept drafted by the Joint Preventive Medicine Policy Group for surveillance information exchange is shown in the accompanying figure. (Figure 2.) Data are generated and used at each echelon, passed up the chain of command, with analysis and reporting at each level. The left side of the diagram illustrates the concept for flow of data and reporting in a deployed theater; the right side shows the exchange "in garrison". While this concept has considerable merit, it remains incomplete. For example, the flow of data from environmental specimens is not included in this concept.

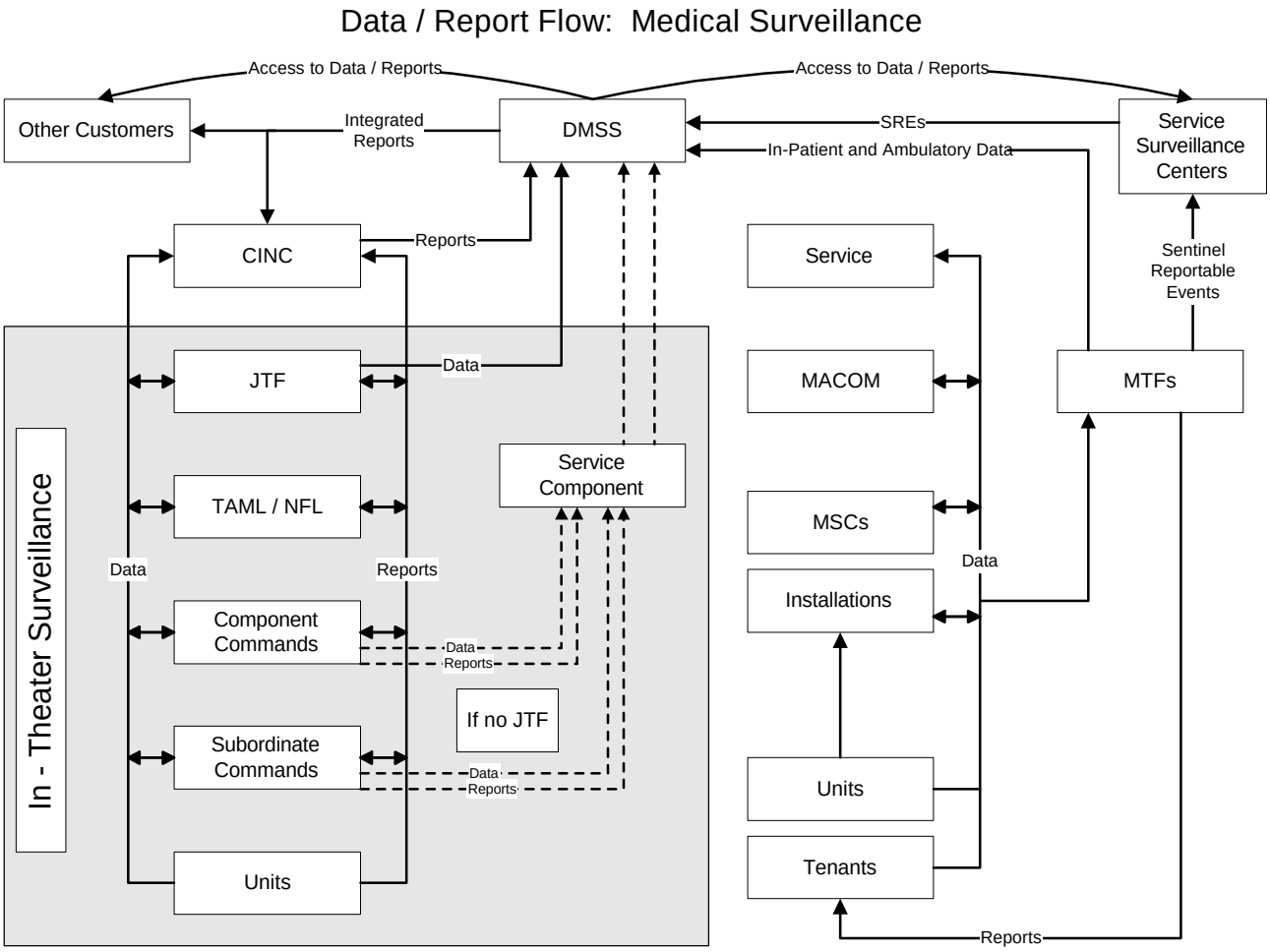
USACHPPM Role in CMMS

As the DOD Executive Agent for CMMS data at the strategic (corporate) level and deployment data analysis, the USACHPPM has taken a lead role in the design and execution of the DOD CMMS capability. Current efforts to date have concentrated on two aspects of CMMS: a comprehensive database known as the Defense Medical Surveillance System (DMSS), and a comprehensive environmental and occupational hazard exposure monitoring effort directed by the Deployment Environmental Surveillance Program (DESP).

Defense Medical Surveillance System (DMSS)

DMSS is a relational database including data on all persons serving on active duty in the military at any time since 1990. DMSS

Figure 2



Legend for Figure 2. Medical surveillance in a deployed theater and in garrison. On the left side of the diagram, surveillance data are collected by echelon I-III medical treatment facilities, shared with unit commanders, and transmitted to higher headquarters, through medical channels. Reports are generated at each level, shared with subordinate units, and archived. At the JTF or theater surgeon level, theater laboratory units (such as Theater Army Medical Laboratory [TAML] or Navy forward deployed laboratory) collect data from subordinate units and produce consolidated joint task force or theater reports. Surveillance data collected in theater is collected in an interim theater database that is forwarded to the DMSS. On the right side of the diagram, data are collected and reports generated by medical treatment facilities on installations, shared with subordinate units and higher headquarters. Appropriate analysis is performed at each level. Major subordinate commands (MSC) and major commands (MACOMs) are included in the reporting chain. SRE= sentinal reportable events (70 diagnoses that require individual reporting).

is operated by the Army Medical Surveillance Activity (Program 30), on the Walter Reed Army Medical Center campus in Washington, DC. The Activity also includes Navy and Air Force staff.

DMSS is the corporate executive information system (CEIS) for strategic public health decision support for the Military Health System (MHS). The DMSS receives and integrates standardized data from multiple Service and DOD sources worldwide. The "engine" of the DMSS is a continuously growing relational database of current and historical data related to medical events (e.g., hospitalizations, outpatient visits, reportable diseases, HIV results, health risk appraisals), personal characteristics (e.g., rank, military occupation, demographic factors), and military experiences (e.g., deployments, assignments) of all Army, Navy, Air Force, and Marine personnel over their military careers. There are now more than 150 million rows of data regarding more than 6.5 million service members in the on-line DMSS database.

Deployment Environmental Surveillance Program (DESP)

The DESP mission is to analyze data and disseminate information concerning the detection, assessment, and reduction of environmental and occupational hazards and health risks during deployments. As part of this mission, the DESP is developing various decision support tools, techniques and procedures, in concert with the AMEDD Center and School, that will allow this information to be assessed as part of the overall command operational risk management program. In the theater environmental and occupational hazard data will be collected under the Theater Medical Information Program's (TMIP) exposure data gathering module.

Historically, U.S. Forces focused exclusively on the catastrophic health effects of nuclear, biological and chemical (NBC) agents used as weapons of mass destruction. Conversely, the potential health threats posed by exposure to low levels of NBC weapons agents and other environmental hazards such as non-weaponized industrial chemicals and ambient air pollution had attracted little attention until the Gulf War. DOD has directed Combatant Commanders and Military Services to document exposure to these potential hazards during military operations as part of a CMMS. The technical and doctrinal solutions to meet these new requirements will be addressed by groups such as the Joint Service Integration Group, and the Joint Environmental Surveillance workgroup. Data on NBC-E exposures will be analyzed and archived by the DESP.

Constraints to CMMS Development

There are numerous challenges to overcome in achieving the ambitious goals set out for CMMS. For the purposes of this discussion, I consider them under two general categories.

Infrastructure

CMMS depends on information management and communications infrastructure at each echelon within the operational

theater and in the garrison environment as shown in Figure 2. Information must also be moved into and out of a deployed theater. For example, automation of medical treatment facilities and linking facilities together is needed to permit the timely calculation of disease and injury rates. Without automation, these rates can be calculated, but timely sharing, aggregation, analysis, and dissemination of this information is hindered. CMMS will depend on elements of TMIP to meet the requirements to support both clinical and environmental aspects of medical surveillance during deployments. In the garrison environment, CMMS will be supported by data generated by Comprehensive Health Care System (II) and others.

Policy and Doctrine

CMMS capability also depends highly upon development of new Joint and Army policies, designating roles and assigning responsibilities of appropriate agencies and individuals. New Joint, Army, and AMEDD doctrine and training are required to allow units and individuals to achieve proficiency in successfully conducting medical surveillance in garrison and in deployments.

A joint instruction, or regulation, has been drafted by the Joint Preventive Medicine Policy Group and its subordinate working groups (Joint Environmental Surveillance Workgroup) that establishes roles, responsibilities, and procedures for CMMS of Service personnel and applies FHP concepts to the deployment setting. This new Joint Service Instruction, currently under review by the Services, will define requirements for deployable forces and describe new procedures for health, environmental, and occupational exposure surveillance activities that occur before, during, and after deployments. It includes the collection, transmission, analysis, reporting, and storing of individual and population health data, environmental and occupational exposure data in order to allow commanders to identify and counter health hazards through their operational risk management program.

CONCLUSION

The Army and the DOD have indicated the requirements for and the commitment to improve their medical surveillance capability. The DMSS and the DESP reflect the DOD investment at the corporate or strategic level. Much work remains to be done to improve the quality and extent of the data available for surveillance, and to establish information systems to support surveillance needs at the operational and tactical levels.

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1. Defense Medical Programming Guidance, page 2 quote from President William Clinton, page 4, Environmental Surveillance, and page 5, Force Health Surveillance.
2. Department of Defense, Health Affairs Medical Readiness Strategic Plan (MRSP), Chapter 4.
3. DOD Directive 6490.2, Joint Medical Surveillance
4. DOD Instruction 6490.3, Implementation and Application of Joint Medical Surveillance for Deployments

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PREVENTIVE MAINTENANCE CHECKS AND SERVICE OF PEOPLE

The Army Suicide Prevention Program, at its very heart, is Preventive Maintenance Checks and Service (PMCS) of people. Good leadership ensures that every vehicle in the motor pool is ready to go to war. Every vehicle is topped off with fuel, lubricated, and safety-checked regularly. But what should we do about the emotional and spiritual readiness of our soldiers?

Every leader in the chain focuses on readiness. We constantly enhance soldiers' physical readiness with inoculations, physical exams, and dental checks. We do critical event debriefings for those who have been emotionally bombarded while performing rescue operations. We offer stress reduction classes for folks who are distressed and teach suicide prevention classes as a reminder of the sanctity of life.

We have many great programs, but programs by their nature are limited in scope. The constant vigilance offered by PMCS of people permeates every task and every mission. No matter how well developed and implemented, programs alone can never substitute for Army Values, which should be second-nature to our every thought and action. Respect is the foremost value when it comes to suicide prevention initiatives.

I was trained in high school as an automobile mechanic. Working as a line mechanic for about seven years in new car dealerships taught me that many people have no respect for a fine machine. They neglect to wash and wax their cars, so the finish deteriorates. They get too busy to schedule an oil change and the engine fails prematurely. They get mud on the carpets and spill drinks on the upholstery! You get the picture: no respect.

The same principles apply to our fellow workers. How often do we expect outstanding performance from others without doing periodic spiritual and emotional safety checks? Furthermore, who do we expect to do these check-ups? The professional care providers (healthcare providers and chaplains)…right? Wrong! That's like expecting wheeled vehicle mechanics to do PMCS on all the vehicles in the motor pool. Then, how about the officers and NCOs? Wrong again. They are often the most overworked and distressed soldiers in the unit. The right answer is to do PMCS on each other all the time.

I applaud the Consideration of Others Program that sets time aside specifically for taking care of interpersonal issues within the workforce. We must not let it become just another program, but make it a constant reminder of our Army Values. However, we need more than a strong Consideration of Others Program. We need to affirm each other, superiors, subordinates and peers alike, with new and innovative ways to show respect. More respect for the fine machines known as PVT Smith, MAJ Lee, SGT Jones, and Ms. or Mr. Long means a more healthy and mission-capable Army.

We need to appreciate their differences in gender, race, religion, and even their preferences for certain foods, games, or type of attire. Respect, cultivated in all our soldiers and civilian workers, is the key to suicide prevention, as well as optimum readiness.

Someone recently asked me, "Chaplain, how do we instill respect?" I think that the answer lies within the system. The Army Values are posted with the acronym "LDRSHIP." The answer must come from leaders within the system. Leaders at every level must demonstrate great respect for others and require it from their subordinates. A sincere and concentrated effort from leaders throughout the chain will reap a bountiful harvest. When attacks on a soldier's person, (for example, "He's a dirtbag") are treated with the same intensity as sexual harassment, then people will think twice before degrading a fellow worker. Respect is more caught than taught and we have a big job ahead of us: just watch a little bit of *The Simpsons* or listen to the lyrics of popular music from the last 20 years or so, if you disagree.

What can we do? First, we must practice the kind of respect that affirms others in our personal sphere of influence, at work and at home. Second, we must police disrespect all the time, everywhere and with everyone: especially our peers. When we treat people as they should be treated, with respect and dignity, we will have a better living environment. Finally, I challenge you to PMCS the people you work beside every day. Affirm them with your friendship and encourage them to do their best work. Take time to notice their extra effort and recognize when they have given their very best. Find ways to show you care and seek out the person who goes unnoticed. Suicide prevention is PMCS of people. You can enhance the quality of life in your unit, if you will only take time to demonstrate respect toward the people with whom you serve. POC: Chaplain (LTC) Gregory L. Black, DSN 584-4656, 410-436-4656, or 1-800-222-9698.

COMBATING COMBAT STRESS: PRESERVING SOLDIERS' MENTAL HEALTH

Combat stress is a serious threat to individual and unit readiness. It can occur during times of war or during military operations other than war (MOOTW). Some stress can actually enhance performance, but too much stress may lead to behaviors that interfere with the unit mission.

POSITIVE AND NEGATIVE OUTCOMES OF STRESS IN A MILITARY UNIT

POSTIVE OUTCOMES	NEGATIVE OUTCOMES
unit cohesion	**Anxiety and irritability**
camaraderie	**Depression and grief**
alertness	**Feelings of inadequacy**
heightened strength and endurance	**Impaired performance**
sense of purpose and mission	**Physical complaints**
tolerance for hardship and pain	**Physical exhaustion**
heroic acts of courage	**Insomnia**

If left untreated, negative reactions to stress can impair soldiers' effectiveness and can lead to more serious behaviors. Those behaviors can threaten unit discipline, the mission, or soldiers' lives.

Causes of combat stress are similar for war or conflict scenarios as well as for MOOTW environments. They include:

- insufficient training for the mission
- cohesion or leadership problems
- home front concerns
- danger
- adverse climate
- periods of prolonged physical and mental demands
- sleep deprivation

Some stressors, however, are unique to war or conflict: prolonged or intense combat and the threat or exposure to death or mutilation.

During MOOTW, soldiers may experience unclear mission duration, ambiguous or changing missions, periods of forced inactivity, seemingly unjustified restrictions on freedom of movement, and unglamorous objectives that receive little attention and validation. Military operations other than war also can generate specific stressors that are unique to the particular mission. During Operation Sea Signal in Cuba, the humanitarian mission was marred by a series of riots by the Cuban refugees who saw themselves as prisoners. Mission Uphold Democracy in Haiti and Operation Restore

Hope in Somalia were operations in which the rules of engagement prohibited self defense and defense of others, in spite of threatened and actual loss of lives.

Prevention is the Army's primary weapon in the battle against combat stress. Prevention means early identification of the stressors that may cause problems for soldiers. Once the potential causes of stress are identified, targeted actions and relevant education and training can be used to reduce or neutralize the stressor. For example, giving soldiers as much warning time as possible and a reliable departure date for the deployment can give them time to get their family and personal affairs in order, prepare more adequately for leaving, and get emotionally used to the idea of the deployment and the time away from their families. Realistic, ongoing training prior to being alerted for deployment also can neutralize many of the doubts and fears soldiers may have and better prepare them for the hardships and demands they will face while deployed.

The second major strategy used to reduce the effects of stressors is early identification of negative stress reactions in units and individuals. Once the signs of combat stress are seen in individual soldiers, immediate actions must be taken to keep negative stress reactions from spreading throughout the unit. Unit leaders and mental health personnel can reduce the spread of stress reactions to other soldiers by fostering a sense of cohesion; providing rest or recreation as needed and as tactically feasible; and allowing as much phone and mail contact with home and family as possible.

Stress reactions in individuals are treated using the following principles:

- Proximity – keeping soldiers with stress reactions as close to their units as is safely and tactically possible.
- Immediacy – treating soldiers as quickly as possible.
- Expectancy – setting the expectation that soldiers will adapt to the stress and return to duty.
- Simplicity and soldierly – providing soldiers with reassurance, rest, nourishment, and an opportunity to express their fears and doubts and expecting soldiers to maintain their military bearing.

Soldiers who are more severely disabled by stress must be evacuated to treatment facilities that can provide longer-term, structured treatment, and sometimes, medication. However, because premature evacuation often leads to long-term or even permanent psychological problems, evacuation should be a last resort.

Being aware of the threat of combat stress and knowing what actions need to be taken to reduce the impact of stressors is key to maintaining soldier effectiveness and safety. During times of war or when engaging in MOOTW, the success of the unit mission depends on recognizing combat stressors and preventing soldiers from becoming combat stress casualties.

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TAKE THE 5 A DAY CHALLENGE: GET FIT WITH 5!

What does it take to be fit? If you think exercising, you are only half-right. Webster defines fitness as "the state or condition of being physically fit, especially as the result of exercise and proper nutrition." So, while exercise is certainly vitally important in achieving fitness, exercise alone cannot make you physically fit. You need both exercise and a nourishing, healthy diet to be fit.

National 5 A Day Week was held September 12-18, 1999. This year the National Cancer Institute (NCI) is challenging Americans to "Get Fit With 5," by emphasizing the importance of both nutrition and physical activity as part of building the foundation for a healthy lifestyle. The NCI encouraged everyone to "Take the 5 A Day Challenge" and team up with friends, family, or coworkers to challenge themselves to a week filled with fun physical activity (a total of 30 minutes or more per day on most days of the week) and tasty fruits and vegetables!

A recent national telephone survey conducted by NCI showed that 36 percent of Americans know they should eat at least five fruits and vegetables each day, but only 23 percent of Americans eat that many servings daily. The DOD 5 A Day Committee found similar results in a survey conducted May 1998 with 288 soldiers at Fort Campbell, Kentucky. Only 25 percent of the soldiers thought they should eat five or more servings of fruits and vegetables, however, only 21 percent actually consumed five or more servings a day. Interestingly, 52 percent thought they should eat only three to four serving a day, but 46 percent consumed only 1-2 servings per day. There seems to be a disconnect between what people think they should eat and what they actually eat. If we want people to eat five or more servings a day, then we may need to encourage them to eat more than just 5 A Day!

On the other hand, it seems as if Americans are doing better as far as physical exercise is concerned. While only 19 percent of Americans say they know the Government's recommendation for 30 minutes or more of moderate physical activity most days of the week, 40 percent say they are meeting or exceeding this recommendation. Since Americans are doing better with the physical activity goals, we need to spend more time and energy promoting the nutrition portion of the 5 A Day program!

For those wanting to see how they measure up, visit the NCI and Centers for Disease Control and Prevention (CDC) web link at www.5aday.gov. This site's interactive chart allows you to enter the number of fruit and vegetable servings you eat, along with your minutes of physical activity for the day. You will then receive a personalized response showing how you are doing compared to other Americans, along with the experts' recommendations and a set of personalized tips. Use this new tool to help you meet the 5 A Day Challenge!

A combination of 5 A Day with 30 minutes of moderate physical activity five days a week are two of the easiest and most concrete things we can do for better health. So Take the 5 A Day challenge and "Get Fit With 5"! POC: LTC Sally S. Hoedebecke, DSN 584-7007, 410-436-7007, or 1-800-222-9698.

REDUCING RISK FROM HIGH CHOLESTEROL

The American Heart Association reports that cardiovascular disease kills almost 1 million people a year, more than all cancer deaths combined. Many of these deaths are caused by atherosclerosis, the silent, gradual accumulation of cholesterol-containing fatty deposits on the walls of the arteries. These deposits enlarge, forming plaques and causing the inner lining of your arteries to become roughened. As plaques build up, the opening in your arteries narrows, reducing the flow of blood. If reduced flow occurs in your coronary arteries, it can lead to a type of chest pain called angina pectoris. A tear or rupture in the plaque may cause a blood clot to form. Such a clot can block the flow of blood or break free and plug an artery downstream. If the flow of blood to a part of your heart is stopped, you'll have a heart attack.

According to Mayo Clinic's Internet health information site, *Health Oasis*,(http://www.mayohealth.org) it is estimated that 98.6 million or 51 percent of American adults have total blood cholesterol levels of more than 200 mg/dl. About 37.7 million or 20 percent have blood cholesterol over 240 mg/dl, which is considered undesirable. These statistics clearly identify high cholesterol as a risk factor across America that requires a significant educational effort to combat.

First, it is important to understand some of the basic facts concerning cholesterol. The American Heart Association lists the following values for blood cholesterol levels.

Many people do not realize that cholesterol is a component of the body's cell membranes and nerve insulation, required for certain hormone production, and essential for the liver to make bile acids, which help digest food. The term cholesterol often refers to both the dietary cholesterol and the cholesterol in the blood. Cholesterol exists in animal products, such as meat and dairy foods, as a dietary lipid. Cholesterol also exists as a natural component of the blood lipids. Your liver makes about 80 percent of the blood cholesterol with only about 20 percent coming from the diet. The

Test	Desirable	Borderline	Undesirable
Total cholesterol	Below 200	200-240	Above 240
LDL cholesterol	Below 130	130-160	Above 160
HDL cholesterol	Above 45	35-45	Below 35
Triglycerides	Below 200	200-400	Above 400

Levels given in milligrams per deciliter. Levels are for people without known cardiovascular disease. If you have established cardiovascular disease, your physician may have different guidelines for you.

amount of fat and cholesterol eaten may influence all levels of the blood lipids, including blood cholesterol levels.

There are several risk factors that affect blood cholesterol that a person can control. These include smoking, obesity, diet, and exercise. Smoking cigarettes damages the walls of the blood vessels, making them prone to accumulate fatty deposits. Smoking may also lower high-density lipoprotein (HDL) by as much as 15 percent. Excess weight increases your triglycerides, lowers HDL and increases very low-density lipoprotein (VLDL) blood cholesterol. Diet and exercise are the first lines of defense against undesirable cholesterol levels. In fact, losing just five or ten pounds can improve triglyceride and cholesterol levels. According to the American Heart Association, making diet changes involves reducing total fat intake by limiting fat to no more than 30 percent of the total daily calories. Do not assume that each food eaten must have less than 30 percent of its calories from fat. Instead, use the guideline to achieve a daily average by balancing occasional high-fat foods with low-fat choices. Remember that no more than ten percent of the fat eaten should be saturated. Major sources of saturated fat are butter, cheese, whole milk, cream, meat, poultry, chocolate, coconut, palm and palm kernel oil, lard and solid shortenings. Be aware that food products high in fat such as hydrogenated shortening or margarine also increase blood cholesterol. Even greater improvements in triglyceride, total cholesterol, and HDL levels can be achieved if one also exercises and loses excess weight along with a low-fat, low-cholesterol diet. Before beginning exercise, seek your doctor's advice. Choose aerobic activity that allows one to gradually build up to exercising for 30 to 45 minutes at least three times a week. The severely overweight, or those that have been inactive for many years, need to take several months to work up to this level. To keep motivated and committed to exercise, schedule a regular time for exercise, choose something enjoyable, and be accountable by exercising with a friend or an exercise group. Changes in diet, along with exercise, can reduce blood cholesterol level by up to 15 percent.

Some of the risk factors for elevated cholesterol, which a person cannot change, include age, gender, and heredity. As one ages, the level of LDL cholesterol usually increases. Until age 45, men generally have higher total cholesterol levels than women. However, after menopause, women's total cholesterol rises and the protective HDL drops unless they take hormone replacement therapy. If an individual's family members have undesirable lipid levels and cardiovascular problems, the risks for these problems are increased. Children in families in which adults have high cholesterol are more likely to have high cholesterol themselves. It is important that children in at-risk families have their cholesterol checked and receive a doctor's advice about proper intervention, such as diet modification. Some people have genetically determined lipid problems (especially LDL) that don't respond adequately to diet changes, exercise. and smoking habits. If one has carried out these important lifestyle changes and the total cholesterol (especially LDL level) remains high, a doctor may recommend a medica-

tion. Before recommending a medication, the doctor will use careful judgment to weigh risk factors, age, current health, and the drug's side effects. If a person needs a cholesterol lowering medication, they will probably need to take it for many years.

As Americans become educated about the risk of elevated blood cholesterol and make behavior changes that will reduce these risks, it is the hope of health care professionals that the life threatening events associated with cardiovascular disease will decrease. Nationally, the negative health impact from high cholesterol levels can be significantly improved through individual behavior change. The key to this desired outcome is targeted education, which focuses on the individual's responsibility for his/her own choices, and is tailored to each person's readiness to change.

An effective education program should include a cholesterol screening, health history questionnaire, a series of awareness messages, health education classes, and an intervention. The education classes should be held after the screening and questionnaire is completed and all individuals at risk have been notified. It is most effective to personally notify the at-risk population about the education classes. Flyers, posters, and marketing messages explaining the dangers of high cholesterol can be used to increase awareness of elevated blood cholesterol as a risk factor for heart disease. To increase the likelihood that each participant will succeed in reducing his or her cholesterol level, an intervention should be conducted as an extension of the health education classes. Ideally, the intervention should incorporate accountability and behavior modification strategies, such as diet and exercise plans. Detailed information on cholesterol education is available from the National Heart, Lung, and Blood Institute (NHLBI) through their highly regarded National Cholesterol Education Program. NHLBI's web site, which also includes an Interactive Site for Lowering Cholesterol for People with Heart Disease, can be found at http://www.nhlbi.nih.gov/nhlbi/cardio.

Though a significant risk factor of cardiovascular disease, cholesterol can be reduced by an individual's effort. A person can combat cholesterol by diet, exercise, losing weight, and not smoking. Coincidentally, these strategies not only improve cholesterol levels but also enhance an individual's overall health and well being.
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CUSTOM EXPLOSIVES ANALYSIS SUPPORTS UNIQUE PROJECT

The DLS recently completed a major project to provide explosives analysis data for the evaluation of alternative technologies for the destruction of chemical warfare agents.

International treaties call for the destruction of the U.S. chemical agent stockpile stored at various locations throughout the country. Many of those storage sites are located near civilian communities. Ever since the Army, which has DOD responsibility for the destruction, announced that incineration of the material was the preferred means, there has been considerable debate about the safety of this approach. Many alternatives, mostly chemical neutralization, have been proposed by independent action groups and private firms. In September 1996, Congress mandated that the Army evaluate leading alternative technologies to incineration.

The Program Manager for Assembled Chemical Weapons Assessment (PM-ACWA), located at APG, MD, was given the task of evaluating the alternatives. "Assembled Chemical Weapons" refers to the fact that these are live shells with explosives, chemical agents, fuses, shipping and firing tubes, packaging materials, and propellants. The testing was to be done at multiple sites throughout the country. The evaluation of the alternatives included an examination of the products left after the neutralization reactions to determine completeness of chemical agent and explosives destruction and to determine disposal considerations. Information on the concentration of explosives and explosive by-products was essential to the decision making process.

The PM-ACWA considered several analytical approaches for explosives determination including U.S. Environmental Protection Agency methods and methodology developed by the Explosives Team of the DLS. Because of intense scrutiny of the project combined with its uniqueness, the PM-ACWA wanted to ensure that test and analytical data were totally reliable to include the explosives data. They enlisted the help of consultants from Arthur D. Little and the National Research Council to help with the selection. DLS was selected to perform all explosives testing for all test sites on the basis of superior technology and ability to perform quality, defensible work.

This was quite a daunting and risky project. Analytical testing of this nature had never been performed before and the project timelines were quite ambitious. The samples included very complex mixtures of chemicals in highly caustic solutions. The DLS chemists did not know if the test objectives could be met or if the large number of difficult samples could be analyzed in a timely manner. The high visibility of the project from equipment manufacturers, Congress, and action groups created a significant pressure to perform.

Test solutions were received in October 1998 and method development and validation began. Significant changes to existing

methods were made. The first actual project samples were received in March 1999. In the following months, 1700 samples of highly caustic hydrolyzates, air sampling trains and filters were analyzed for as many as 15 explosive compounds. Between analysts and supporting staff, 14 DLS staff members worked on this project. The last report went out in the first week of June 1999.

The DLS work on this project gave PM-ACWA, Congress, and the public the information they needed when they needed it. This success was the result of superb applied talent and ingenuity, excellent planning and coordination, and extraordinary teamwork. The DLS contributors were recently recognized with a group special act award. POC: LTC Douglas Rinehart, DSN 584-3639, 410-436-3639, or 1-800-222-9698.

NEW TOOLS FOR DETECTING DEPLETED URANIUM

Use of depleted uranium (DU) in vehicle armor and armor-piercing shells is highly effective because of the physical properties of uranium. However, the use of DU poses potential health effects because of its toxicity as a heavy metal and, to a lesser extent, its radioactivity. It is the job of preventive medicine personnel to assess such health threats. Sampling and analysis is needed in order to provide information for such assessments.

Routine analytical methods for this task did not meet the needs of preventive medicine personnel. Trace levels for total uranium needed to be determined as well as methods to distinguish DU from natural uranium with small uncertainty. The task of developing specific methods for military needs was placed upon the DLS.

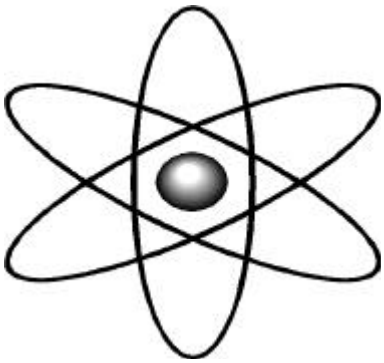
Natural uranium differs from DU in its isotopic content. Simply stated, natural uranium has more atomic weight 235 uranium and less atomic weight 238 uranium than does DU. This atomic weight difference is miniscule - much too small to be weighed - but significant enough to be detected with a mass selective detector. When the mass selective detector is coupled to an inductively coupled plasma (ICP) spectrometer, which atomizes liquid samples, the resulting ICP-mass spectrometer (MS) is a powerful tool for the identification and quantification of trace elemental isotopes like uranium-235 and 238.

The ICP-MS technique had been used sparingly for uranium analysis. DLS scientists in the Metals Analysis and Radiochemistry Teams worked together to de-

velop sample preparation and analysis techniques to accurately detect low levels of uranium e.g. 20 parts per trillion for urine specimens after chemical processing.

This was only part of the solution to a difficult problem. Just detecting uranium did not mean it was from military use of DU. Natural uranium exists everywhere in the world at varying trace levels. So just having the isotopic data did not tell us how much, if any, DU was present. The known percent of uranium-235 in natural uranium is 0.72 percent and for DU it is about 0.20 percent. An equation was developed to determine the amount of DU in the sample when the percent is slightly depressed, e.g. 0.61 percent. This solved the problem and permitted quantitation of DU even in a mixture of natural uranium and DU.

To date, methods have been developed and validated for water and soil. Methods for air and urine analyses are in the works. The methods have successfully been applied to the analysis of many samples to include nearly 300 sand samples to support the Office of the Special Assistant for Gulf War Illness under DOD Health Affairs. This methodology is an excellent piece of developmental science and provides valuable information previously unavailable to the preventive medicine community. POC: Mr. Ron Swatski, DSN 584-3983, 410-436-3983, or 1-800-222-9698.



HOUSEHOLD ELECTROMAGNETIC INTERFERENCE (EMI)

We have all experienced circumstances where the vacuum causes snow on your TV or the flight attendant asked you to turn off all electronic equipment prior to take-off or landing. Do you recall hearing about the runaway wheelchairs? Have you ever thought to ask yourself, "What is it that is affecting the wheelchair or my TV?" One thing we know, it is not magic. It is electromagnetic interference or EMI [if you prefer]. Although you can't see EMI or hear EMI or touch EMI, it none the less is a real phenomenon. EMI is loosely defined as any electrical or magnetic energy that interferes with or obstructs the performance of electrical or electronic equipment. Although EMI can be intentionally induced for specific military applications, in the consumer market, it is always an unwelcome guest.

For EMI to exist, three things must be present. First, there must be a source that will transmit or send electrical and/or magnetic energy. These sources are all around and by themselves do not pose a problem. Vacuum cleaners, fluorescent lights, AM radio stations, portable electronic games, and electric clothes dryers are all examples of transmitting electrical equipment. Indeed most electrical and electronic equipment [hereafter referred to as electronic equipment] transmit some form of electrical and electronic energy. The second part of the puzzle is an electronic receiver or a victim. The receiver is usually, but not always, designed to receive electrical signals. Intentionally or not, the receiver is so named because it can absorb the electromagnetic energy. Some examples are televisions, AM/FM radios, satellite TV dishes, pagers, aircraft altimeters and navigational equipment, pacemakers, and medical equipment.

Many devices such as cellular phones, walkie-talkies, portable phones, computers, and CB radio do both, that is, send and receive electrical and/or magnetic energy. They can behave as a source in one situation and become a victim in another situation.

Indeed, sources and receivers co-exist everyday and have become an important part of how we live and do business. An EMI problem is only created when there is an <u>unwanted</u> pathway created between a source and an unintended receiver. The following are some examples of unintended source/receiver pairs:

- Your vacuum cleaner or your hair dryer interferes with your television reception.
- You AM car radio buzzes as you pass under power lines.
- Your computer's monitor screen flickers when you turn on the fluorescent lights.
- You can hear your neighbor's telephone conversation on your portable phone.
- You can hear CB radio conversations on your FM stereo.
- A passenger's cell phone, CD player or portable electronic game interferes with the airplane's navigational instrumentation.
- A TV station causes a hospital's medical monitoring equipment to malfunction.
- A microwave oven interferes with a medical patient's pacemaker.

How do you recognize an equipment malfunction as being caused by EMI and not by something else, such as a

component failure? First, ask yourself, is this an intermittent problem? Does this problem come and go at different times of the day?" Usually an EMI problem is intermittent and not damaging to the receiving equipment and therefore when the source is turned off the receiving equipment begins to again function correctly. The safest and easiest way to solve an EMI problem is to identify the source. Take an inventory of what electronic equipment is operating in the vicinity. Systematically, turn each source device off and observe the receiving equipment to see if it begins to operate correctly. Remember that for EMI to be present, it need not stop electronic equipment from operating. It only has to interrupt the normal operation of the receiving equipment. It is often observed as a hum or buzz, temporary static, a chromatic color shift on a monitor, or screen flickering. Did the screen stop flickering? Did the snow on the TV go away? If so, you have correctly found the source of your EMI problem.

Now what do we do about eliminating the pathway between the source and the victim? This can be a long and tedious process, so let's address the two easiest solutions. Can you manage your time between the source and the victim so they don't both have to be on and operating at the same time? This is by far the simplest solution. If so, then turn off either the source or the victim. Although this is not technically a solution, it is an accepted way to mitigate EMI problems. If you need both the source and victim on and operating at the same time, then try separating them as far away from each other as you can. EMI loses its power as the distance between the two devices is increased. The interference decreases as the distance between the source and victim is increased.

Other EMI techniques include attenuating the source's electronic signal or hardening the victim so the electromagnetic energy cannot penetrate the equipment. If we can eliminate just one part of the EMI trilogy (the source, the victim, or the pathway), then we have corrected the EMI problem.

But how does EMI affect us? Most EMI problems are minor by nature and pose more of a nuisance or annoyance. EMI problems threaten our lives when operators have to rely on electronic equipment to perform safe and accurate procedures. If an electronic system is degraded or obstructed in such a way that accurate data cannot be obtained, then a potentially serious situation could arise. For example, a military aircraft is preparing to land at a nearby Army base. An unsuspecting homeowner uses the automatic garage door opener as they always have. The aircraft navigational gauges fluctuate widely and the pilot no longer has an accurate bearing on his location or altitude. The pilot is forced to eject and the aircraft is lost. Although most EMI problems are not this extreme, it does demonstrate the gravity of the situation that EMI can cause. Most EMI problems are trivial. We can all live with snow while the vacuum is running. Situations like this one do not pose a threat to our lives or safety. However, when electronic equipment is used to diagnose or monitor medical patients, fly an aircraft, or perform on a battlefield, the implications of EMI can become very serious.

The next time you are faced with a similar situation that you can't explain, you'll be prepared to look at the circumstances in a different way. Remember it is not magic or some unexplained force at work. It may just be EMI. Knowing how to recognize a possible problem will go a long way in providing a solution.

POC: Mr. Frank Colville, DSN 584-3353, 410-436-3353 or 1-800-222-9698.

USACHPPM-EUROPE

CHANGE OF COMMAND

(l to r) COL Broadwater, BG Simmons, and COL Rauch

Colonel William T. Broadwater passed command responsibility for USACHPPM-Europe to Colonel Terry M. Rauch on August 11. The ceremony was held on the parade field at USACHPPM-Europe, Landstuhl, Germany and featured the 1st Armored Division Band from Bad Kreuznach, Germany.

BG Bettye Simmons, Commander, USACHPPM, hosted the ceremony. Distinguished guests attending the ceremony were the Honorable Sue Bailey, Assistant Secretary of Defense for Health Affairs; Ms. Mary B. Gerwin, Senior Advisor to Assistant Secretary of Defense for Health Affairs; BG Michael J. Kussman, European Regional Medical Command Commander; Rear Admiral Richared Mayo, Joint Chief of Staff for Logistics, Medical Readiness Division; and Herr Remler, representing the Landrat for Rhineland Pfalz.

Simmons thanked Colonel Broadwater for commanding USACHPPM-Europe. She said: "You have helped to make USACHPPM-Europe the leader in force

health protection as you deployed teams on 50 missions in support of military operations in the Balkans, Middle East, Southwest Asia, and Africa and in support of 10 joint military exercises. We wish you the best in your new assignment at the 3rd Medical Command in Atlanta, GA." She welcomed Colonel Rauch and said, "From Macedonia to Kosovo to Albania, our medical teams are busy protecting the health of our soldiers. We are depending on you to continue the progress in providing a safe, healthy environment for our service members. I am confident that you and your command will continue to be the spearhead for force health protection in your area of operation. I ask you to take care of people. They are your greatest asset in your mission to support health promotion and preventive medicine programs."

Rauch is a native of Cincinnati, Ohio. He received a B.S. and Ph.D. from the University of Cincinnati. His military education includes completion of the Army Command and General Staff College, the Naval Command and Staff College, and the Army War College. He has authored over 50 scientific and technical publications in the field of psychology and neurosciences and completed post-doctoral training at the Karolinska Institute and Carnegie Medicin, Stockholm, Sweden.

Rauch said: "I am privileged to take command of a great unit with a rich history of military medicine dating back over a half century. Today, health promotion and preventive medicine are the cornerstones of force health protection. These corner stones are vital to achieving our national security objectives. We are the tip of the spear! I pledge my fullest commitment to supporting our service members, civilian work force, and multinational partners across the broad range of military operations. Equally, I pledge my fullest commitment to supporting our families. The challenges in military medicine are significant, but we are resolute in our dedication to meeting those challenges."

USACHPPM-WEST

PEST MANAGEMENT

Members of the Entomological Sciences Division, USACHPPM-West, wrote a guide to Self-Help Pest Management that was published by the Armed Forces Pest Management Board as Technical Information Memorandum (TIM) No. 42. This comprehensive document describes the benefits of using self-help techniques and materials to control pests in military quarters. The TIM will help to support and standardize self-help pest management with DOD. This document is also useful for Reserve and National Guard personnel who want guidance on the control of minor pests in Reserve Centers or Armories where normal installation support is not present. Two-page fact sheets are available for 25 common household pests and can be copied and used as handouts at installation self-help stores. POC: Mr. Harrison, DSN 347-0084.

USACHPPM-SOUTH

Industrial Hygiene Services for the U.S. Army Reserve Command

A successful Occupational Safety and Health Program consists of many elements. First and foremost is the initial health hazard inventory. These data are crucial for establishing program requirements and priorities for support. Other elements include medical surveillance, required programs (such as hearing and vision conservation), employee education and training, hazard control, and the implementation plan.

The U.S. Army Reserve Command (USARC) is turning to USACHPPM more and more frequently to assist them in establishing their own Occupational Safety and Health Program. The USARC requests services through the USACHPPM Liaison Office (Mr. John Bogardus, DSN 367-2827) located at USACHPPM-South, Fort McPherson. The location of the U.S. Army Reserve Command Liaison Officer (USARCLO) is ideal, as the USARC Headquarters is also located at Fort McPherson.

The USARC requested a comprehensive health hazard inventory of all maintenance activity jobs. In order to complete this effort as quickly as possible while

maximizing limited resources, one of the ten USARC Regional Support Commands (RSCs) was selected and will be used to model similar exposure groups representing all the RSCs. The ten USARC RSCs' operations are generally similar, consisting of Area Support Maintenance Activities (AMSAs) and Equipment Concentration Sites (ECSs).

The USACHPPM-South has been working with the 90th RSC as the model RSC. The 90th RSC has 17 sites and to date, USACHPPM-South has completed 50 percent of the inventories. To assist with data collection, a pre-survey questionnaire was sent to all shop supervisors. This questionnaire asked for details regarding specific operations performed, how often, work schedules, and number of personnel assigned. With these data, USACHPPM-South planned specific on-site visits. In addition to collecting air samples, personnel reviewed Occupational Safety and Health Programs (Hearing Conservation, Respiratory Protection, Hazard Communication, etc.) and work practices.

Once data collection is complete, USACHPPM-South will enter the data into the Health Hazard Information Module system and complete a trend analysis. The goal is to use the data to represent similar work environments within the RSC and allow the USARC to establish a comprehensive Occupational Safety and Health Program. The USACHPPM-South will then develop a protocol for each of the required elements. The overall program will include routine industrial hygiene support requirements, medical surveillance requirements, and routine auditing requirements. In addition, USACHPPM-South will provide guidance on proper work practices, engineering controls, and personal protective equipment required to reduce exposures and improve safety.

Once developed, the USARC will implement the program at the 90th RSC and use it as a template for the other nine RSCs.

This project is scheduled for completion by June 2000. POC: CPT Reginald J. Richards, DSN 367-2307 or 404-464-2307.

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