

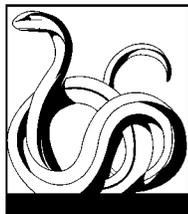
Strategies to Protect the Health of DEPLOYED U.S. FORCES

*Medical Surveillance,
Record Keeping, and
Risk Reduction*

Lois M. Joellenbeck, Philip K. Russell, and
Samuel B. Guze, *Editors*

Medical Follow-Up Agency

INSTITUTE OF MEDICINE



NATIONAL ACADEMY PRESS
Washington, DC

NATIONAL ACADEMY PRESS • 2101 Constitution Avenue, N.W. • Washington, DC 20418

NOTICE: The project that is the subject of this report was approved by the Governing Board of the National Research Council, whose members are drawn from the councils of the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine. The members of the study team responsible for the report were chosen for their special competences and with regard for appropriate balance.

The Institute of Medicine was chartered in 1970 by the National Academy of Sciences to enlist distinguished members of the appropriate professions in the examination of policy matters pertaining to the health of the public. In this, the Institute acts under both the Academy's 1863 congressional charter responsibility to be an advisor to the federal government and its own initiative in identifying issues of medical care, research, and education. Dr. Kenneth I. Shine is president of the Institute of Medicine.

Support for this project was provided by Contract No. DASW01-97-C-0078 between the National Academy of Sciences and the Department of Defense. The views, opinions, and/or findings contained in this report are those of the authors and do not necessarily reflect the view of the organizations or agencies that provided support for the project.

International Standard Book Number 0-309-06637-9

Additional copies of this report are available for sale from National Academy Press, 2101 Constitution Avenue, N.W., Lock Box 285, Washington, DC 20055. Call (800) 624-6242 or (202) 334-3313 (in the Washington metropolitan area), or visit the NAP's online bookstore at **www.nap.edu**. The full text of this report is available online at: **www.nap.edu/readingroom**.

For more information about the Institute of Medicine, visit the IOM home page at: **www.iom.edu**.

Copyright 1999 by the National Academy of Sciences. All rights reserved.

Printed in the United States of America

The serpent has been a symbol of long life, healing, and knowledge among almost all cultures and religions since the beginning of recorded history. The serpent adopted as a logotype by the Institute of Medicine is a relief carving from ancient Greece, now held by the Staatliche Museen in Berlin.

**STRATEGIES TO PROTECT THE HEALTH OF DEPLOYED
U.S. FORCES: MEDICAL SURVEILLANCE, RECORD KEEPING,
AND RISK REDUCTION**

Principal Investigators

SAMUEL B. GUZE, Spencer T. Olin Professor of Psychiatry, Washington
University School of Medicine

PHILIP K. RUSSELL, Professor Emeritus, Department of International
Health, Johns Hopkins School of Hygiene and Public Health

Advisory Panel

ARTHUR J. BARSKY, III, Professor, Department of Psychiatry, Harvard
Medical School, Brigham and Women's Hospital

DAN BLAZER, II, Dean of Medical Education and J.P. Gibbons Professor of
Psychiatry, Duke University Medical Center

GERMAINE M. BUCK, Associate Professor, Department of Social and
Preventive Medicine, University at Buffalo, State of New York

CHARLES C. J. CARPENTER, Professor of Medicine, The Miriam Hospital,
Brown University

JOHN A. FAIRBANK,* Associate Professor, Department of Psychiatry and
Behavioral Sciences, Duke University Medical Center

KENNETH W. GOODMAN, Director, Forum for Bioethics and Philosophy,
University of Miami

SANFORD S. LEFFINGWELL, HLM Consultants, Atlanta, Georgia

BRUCE S. McEWEN, Professor and Head, Harold and Margaret Milliken
Hatch Laboratory of Neuroendocrinology, Rockefeller University

G. MARIE SWANSON, Director, Cancer Center, and Professor, Department of
Family Practice and Medicine, Michigan State University

PAUL C. TANG, Medical Director, Clinical Informatics, Palo Alto Medical
Foundation, and Vice President, Epic Research Institute

FRANK W. WEATHERS, Assistant Professor, Department of Psychology,
Auburn University

NEIL D. WEINSTEIN, Professor, Department of Human Ecology, Cook
College, Rutgers University

Study Staff

LOIS JOELLENBECK, Study Director

RAJESH VENUGOPAL, Research Assistant

AIMEE BOSSE, Project Assistant

RICHARD MILLER, Director, Medical Follow-Up Agency

*Through September 1998.

REVIEWERS

This report has been reviewed in draft form by individuals chosen for their diverse perspectives and technical expertise, in accordance with procedures approved by the National Research Council's Report Review Committee. The purpose of this independent review is to provide candid and critical comments that will assist the Institute of Medicine in making the published report as sound as possible and to ensure that the report meets institutional standards for objectivity, evidence, and responsiveness to the study charge. The review comments and draft manuscript remain confidential to protect the integrity of the deliberative process. The study team wishes to thank the following individuals for their participation in the review of this report:

JOHN F. AHEARNE, Ph.D., Sigma Xi Center, Research Triangle Park, N.C.
MARION J. BALL, Ed.D., School of Nursing, Johns Hopkins University, and
First Consulting Group, Baltimore, Md.
RUTH BERKELMAN, M.D., Centers for Disease Control and Prevention,
Atlanta
DONALD L. CUSTIS, M.D., Potomac, Md.
JAMES D. EBERT, Marine Biological Laboratory, Woods Hole, Mass.
HAROLD M. KOENIG, M.D., San Diego, Calif.
KATHLEEN A. McCORMICK, Ph.D., SRA International, Fairfax, Va.
ENRIQUE MENDEZ, Jr., M.D., Stafford, Va.
CHARLES E. PHELPS, Ph.D., University of Rochester
MICHAEL C. SHARPE, M.D., University of Edinburgh and Royal Edinburgh
Hospital, Scotland
GUTHRIE L. TURNER, Jr., M.D., Division of Disability Determination
Services, State of Washington

Although the individuals listed above have provided constructive comments and suggestions, it must be emphasized that responsibility for the final content of this report rests entirely with the principal investigators and the Institute of Medicine.

Preface

Protecting the health of military service members during deployments is vitally important to the accomplishment of the military mission as well as to the welfare of the service members. Deployments present unique and difficult challenges in preventive medicine, but through many years of research and progress in military medicine, military medical departments have made tremendous strides in the medical protection and care they can now offer soldiers, sailors, airmen, and marines.

The medical consequences of the Gulf War have made it clear, however, that some threats remain poorly understood and inadequately addressed. Despite very low levels of combat casualties and disease and non-battle injuries during both the buildup to the war and the war itself, many veterans have since reported health problems that they attribute to their service in the war. Many of these are unexplained illnesses that have proved to be frustrating to diagnose and treat.

Since the Gulf War, our military has seen an increasing tempo of deployments and demands, including operations in Haiti, Somalia, Bosnia, Southwest Asia, and Kosovo. What lessons have been learned from these operations as well as the Gulf War, and how can forces in future deployments best be protected? A 3-year National Academies study has been charged with addressing these questions.

The first part of the 3-year study has been carried out as four parallel 2-year tasks. The four tasks were to (1) develop an analytical framework for assessing the risks to deployed forces; (2) review and evaluate improved technologies and methods for the detection and tracking of exposures to those risks; (3) review and evaluate improved technologies and methods for physical protection and decontamination, particularly for chemical and biological agents; and (4) review and evaluate medical protection, health consequences management and treatment, and medical record keeping.

Now at the close of the 2-year efforts, the group responsible for each task is providing a report to the U.S. Department of Defense and the public on its findings and recommendations in these areas. These documents will serve as the starting point for the work of a new committee that will prepare a synthesis document for the U.S. Department of Defense in the third year of the project. The committee will consider not only the topics specifically raised by the four 2-year studies but also overarching issues relevant to its broader charge.

The study presented in this report has focused upon the fourth task described above. Our broad charge (found in Appendix B and discussed further in Chapter 1) includes almost all aspects of military medicine: both prevention of adverse health outcomes from exposures to deployment risks and treatment of the health consequences of prevention failures, including battle injuries, disease and non-battle injuries, acute management, and long-term follow-up. The charge also specifies seven other areas including medical surveillance, medical record keeping, risk communication, reintegration, vaccines and other prophylactic agents, predeployment screening, and active-duty retention standards.

Unlike the typical National Academies study, this effort was carried out not by consensus committee but by ourselves as principal investigators with the help and guidance of a panel of experts in the range of topics covered by the study. We held five workshops to gather information on topics within the study charge.

No single study team or series of workshops could do justice to the entire breadth of topics included in our study charge. We therefore decided to focus on topics in which we felt outside consultants could provide particularly helpful advice to the military in light of lessons from recent deployments. We did not address topics such as management of battle injuries or prevention of well-known infectious disease threats with which the military has a depth of expertise. We had little additional to offer on such topics, and therefore were silent.

This study team did not take up issues of the etiologies of illnesses in Gulf War veterans, as it was not part of our charge. Considerable effort and expertise have been and continue to be applied to these issues by several expert panels and researchers, and their work is likely to continue for many years to come.

However, we believe that there are clear lessons from the Gulf War experience, and these are reflected in our report's focus on medically unexplained symptoms, medical surveillance, and medical record keeping. With medically unexplained symptoms, there is a growing body of evidence that they can be managed and treated, even though their cause or pathogenesis is not fully understood. A signed paper provided in Appendix A of the report was particularly helpful in informing our deliberations on this topic.

We emphasize medical surveillance and medical record keeping because they are crucial tools for providing optimum population-based and individual medical care for service members and providing the basis for future population-based epidemiologic studies of deployment-related illnesses. The two topics are necessarily interrelated. Complete and accessible medical records are an essential component of effective medical surveillance as well as a critical element of optimal health care.

Risk communication is another important component of the responsibility that the military has to its service members, as is supportive reintegration of service members back to their nondeployed status. We dwell on these topics at some length because they are important tools for the care of service members. Ready formulas for carrying them out well are not available, so concerted effort and research are needed.

In many of these areas, the U.S. Department of Defense has already made important progress. New programs have been implemented and others have been planned. One particularly encouraging event was the release by the Executive Office of the President of *A National Obligation: Planning for Health Preparedness for and Readjustment of the Military, Veterans, and Their Families after Future Deployments*. This document presents a strategic plan prepared by an interagency working group with representatives of the U.S. Departments of Defense, Veterans Affairs, and Health and Human Services. The plan includes many excellent goals, objectives, and strategies for protecting the health of service members and veterans and providing reintegration support for them and their families. It is a very positive sign that these goals have been recognized at the highest levels, and we hope that implementation of these goals similarly finds high-level support. A tool to help with aspects of the plan requiring interagency coordination is the establishment of the Military and Veterans Health Coordinating Board. As this report enters review this group is being constituted, and we hope that they are effective champions of implementing the strategic plan outlined in *A National Obligation*.

We are grateful to our panel of advisors who gave their time and talents to this project. We are similarly indebted to the members of the public health, military preventive medicine, and military and veterans health care communities who offered their insights to this project. A list of these people, no doubt incomplete, is found in Appendix G.

Improving the ability of the armed services to protect and maintain the health of service members remains a challenging endeavor. We hope this study will assist the U.S. Department of Defense with carrying out its responsibilities to the military men and women who serve our nation.

Philip K. Russell, M.D.
Samuel B. Guze, M.D.
Principal Investigators

Acronyms

AVIP	Anthrax Vaccine Immunization Program
BT	botulinum toxoid
CBT	cognitive behavior therapy
CDC	Centers for Disease Control and Prevention
CFS	chronic fatigue syndrome
CHCS	Composite Health Care System
CORBA	Common Object Request Broker Architecture
CPR	computer-based patient record
CSC	combat stress control
DEERS	Defense Eligibility Enrollment Record System
DHHS	U.S. Department of Health and Human Services
DMED	Defense Medical Epidemiologic Database
DMSS	Defense Medical Surveillance System
DNBI	disease and non-battle injury
DoD	U.S. Department of Defense
FDA	U.S. Food and Drug Administration
GCPR	Government Computer-Based Patient Record
HEAR	Health Evaluation and Assessment Review
HIPAA	Health Insurance Portability and Accountability Act
HIV	human immunodeficiency virus

ICD-9	International Classification of Diseases, version 9
IND	investigational new drug
IOM	Institute of Medicine
ITM	Immunization Tracking Module
JCS	Joint Chiefs of Staff
JPO-BD	Joint Program Office for Biological Defense
JTF	Joint Task Force
JVAP	Joint Vaccine Acquisition Program
MFUA	Medical Follow-Up Agency
MI	mass immunization
NBC	nuclear, biological, and chemical
NCHS	National Center for Health Statistics
NSTC	National Science and Technology Council
Operation READY	Operation “Resources Educating About Deployment and You”
PAARTS	Patient Accounting and Reporting Real-Time Tracking System
PB	pyridostigmine bromide
PHCA	Preventive Health Care Application
PIC	personal information carrier
PPMs	personal protective measures
PTSD	post-traumatic stress disorder
RAP	Recruit Assessment Program
RCS	Readjustment Counseling Service
TMIP	Theatre Medical Information Program
USARIEM	U.S. Army Research Institute of Environmental Medicine
VA	U.S. Department of Veterans Affairs
WRAIR	Walter Reed Army Institute of Research