

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

Analytical Framework for Assessing Risks

Lorenz Rhomberg, *Principal Investigator*

Board on Environmental Studies and Toxicology
Commission on Life Sciences
National Research Council

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Preface

Illnesses possibly associated with U.S. military deployments during Operations Desert Storm and Desert Shield (1990-1991) have been the subject of much debate and national attention. In order to help prevent and reduce the number of illnesses in future deployments, the Department of Defense (DOD) requested that the National Academy of Sciences (NAS) develop a long-term strategy for protecting the health of the nation's military personnel when deployed to unfamiliar environments. As part of the academy's response to this request, I was asked to develop an analytical framework for assessing risks to deployed forces from a variety of health threats encountered during deployments. A group of advisers was convened to assist me with the project, providing me with advice in their various areas of expertise and guiding the development of the framework. I am very appreciative of the valuable input they provided.

As part of the information gathering for this study, DOD personnel provided very useful presentations on relevant DOD programs. I wish to acknowledge in particular COL Francis O'Donnell (Office of the Special Assistant for Gulf War Illness), Jack Heller (U.S. Army Center for Health Promotion and Preventive Medicine), John Resta (U.S. Army Center for Health Promotion and Preventive Medicine), Hank Gardner (U.S. Army Center for Environmental Health Research), MAJ Larry Kimm (Joint Staff), CDR Paul Knechtges (U.S. Army Center for Environmental Health Research), and Thomas Burke (Johns Hopkins University). These briefings were especially helpful because I was chosen for this project expressly as a person without extensive experience in military matters and am not well versed in military organization structure, operations, policy, or doc-

trine. Since DOD's aim was specifically to obtain an independent assessment of how the military can protect their deployed personnel in the future, I hope my newness to these matters can lead to some benefit in freshness of point of view that will offset the lack of extensive experience into the military's current extensive activities and programs.

Special thanks are owed to the six authors who were commissioned to write papers on topics that needed more in-depth analysis. Morton Lippmann (New York University School of Medicine) discussed approaches for collecting and using personal exposure and biological-marker information for assessing health risks; Edward Martin (Edward Martin and Associates, Inc.) characterized possible scenarios of future deployments and battle considerations; Joseph Rodricks (The Life Sciences Consultancy) reviewed traditional risk assessment methods and how risk assessment in general might be applied to deployment scenarios; Joan Rose (University of South Florida) addressed health assessment and risk management integration for biological agents; Karl Rozman (University of Kansas Medical Center) proposed a new paradigm for incorporating toxicokinetic information in risk assessment; and Raymond Yang (Colorado State University) discussed toxicologic interactions among harmful agents. These authoritative papers were presented at a workshop on January 28-29, 1999 in Washington, DC, and have been published concurrently with this report (see *Workshop Proceedings on Strategies to Protect the Health of Deployed U.S. Forces: Assessing Health Risks to Deployed U.S. Forces*).

This report has been reviewed in draft form by individuals chosen for their technical expertise and diverse perspectives in accordance with procedures approved by the NRC's Report Review Committee for reviewing NRC and Institute of Medicine reports. The purpose of that independent review was to provide candid and critical comments to assist the NRC 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. I wish to thank the following individuals, who are neither officials nor employees of the NRC, for their participation in the review of this report: John C. Bailar, III, University of Chicago; Thomas A. Burke, Johns Hopkins University; Steven D. Colome, Irvine, California; John L. Emmerson, Fishers, Indiana; Bernard D. Goldstein, Rutgers University; Rogene F. Henderson, Lovelace Respiratory Research Institute; Peter Hidalgo, Waverly Hall, Georgia; Paul Knechtges, Sherikon, Inc.; Matthew S. Meselson, Harvard University; and Arthur C. Upton, Rutgers University.

The individuals listed above, as well as the advisers for this project,

have provided many constructive comments and suggestions. It must be emphasized, however, that responsibility for the final content of this report rests entirely with the principal investigator and the NRC.

I would also like to acknowledge the principal investigators of the three sister projects that were conducted concurrently with this one. Thomas McKone (University of California, Berkeley) was the principal investigator of a project that considered technology and methods for detection and tracking of exposures to a subset of harmful agents; Michael Kleinman (University of California, Irvine) and Michael Wartell (Indiana University - Purdue University Fort Wayne) were co-investigators of a project that reviewed and evaluated approaches and technologies used in the development and evaluation of equipment and clothing for physical protection and decontamination; and Samuel Guze (Washington University) and Phillip Russell were co-investigators who reviewed and evaluated medical protection, health consequences management and treatment, and medical record keeping.

My personal thanks are also owed to the NRC staff who were involved in this project. In particular, Carol A. Maczka and Raymond A. Wassel expertly brought structure to the project and guided the interactions among DOD briefers, the advisory committee, and the commissioned authors along productive lines. Susan N.J. Pang provided essential technical help, especially in obtaining documentation and preparing material. Other staff members who contributed to this effort are James J. Reisa, Robert J. Crossgrove, Catherine M. Kubik, and Leah L. Probst.

Lorenz Rhomberg
Principal Investigator

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Analytical Framework for Assessing Risks

