

Veterans of the Persian Gulf War report a variety of physical and psychological symptoms, some of which remain unexplained. In an effort to determine the extent to which these symptoms may be related to Gulf War service and to develop policies to better deal with health risks in future deployments, the Secretary of Defense designated a special assistant to oversee all Department of Defense (DoD) efforts related to the illnesses of Gulf War veterans. The Office of the Special Assistant for Gulf War Illnesses (OSAGWI) is charged to do everything possible to understand and explain the illnesses, to inform veterans and the public of its progress and findings, and to recommend changes in DoD policies and procedures to minimize such problems in the future.

This literature review, one of eight commissioned by the Special Assistant to the Deputy Secretary of Defense for Gulf War Illnesses, summarizes the existing scientific literature on the health effects of the classes of pesticides that may have affected military personnel who served in Operations Desert Shield and Desert Storm (ODS/DS). The eight RAND reviews are intended to complement efforts by the DoD and other federal agencies to understand the full range of health implications of service in that conflict.

The other seven RAND literature reviews deal with chemical and biological warfare agents, depleted uranium, oil well fires, pyridostigmine bromide, immunizations, infectious diseases, and stress. These represent plausible causes of some of the illnesses Gulf War veterans have reported.

The reviews are intended principally to summarize the scientific literature on the known health effects of given exposures to these risk factors. Where available evidence permits, the other seven reviews also summarize what is known about the range of actual exposures in the Gulf War and assess the plausibility of each risk factor as a cause of illness. A RAND report complementary to this review examines the exposure of Gulf War veterans to pesticides through an ex-

tensive survey;<sup>1</sup> consequently, this review does not detail the actual range of pesticide exposures during ODS/DS. Statements related to the Gulf War experience should be regarded as suggestive rather than definitive, for more research on health effects and exposures remains to be completed before definitive statements can be made. Recommendations for additional research are included where appropriate.

The RAND reviews are limited to literature published or accepted for publication in peer-reviewed journals, books, government publications, and conference proceedings. Unpublished information is occasionally used, but only to develop hypotheses. The present review uses literature published before completion of the initial draft, but some additional references have been included, primarily in response to peer review.

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<sup>1</sup>Fricker, R. D., et al., *Pesticide Use During the Gulf War: A Survey of Gulf War Veterans*, Santa Monica, CA: RAND, MR-1018/12-OSD, 2000.