



PERSONNEL AND
READINESS

UNDER SECRETARY OF DEFENSE
4000 DEFENSE PENTAGON
WASHINGTON, D.C. 20301-4000

JUN - 5 2020

The Honorable James M. Inhofe
Chairman
Committee on Armed Services
United States Senate
Washington, DC 20510

Dear Mr. Chairman:

The enclosed report is in response to Senate Report 116–103, page 239, accompanying S. 2474, the Department of Defense Appropriations Bill, 2020, detailing the scope and impact of respiratory illness on military personnel—particularly on deployed troops—dating from the first Gulf War to the present.

The report provides a detailed review of respiratory illness experienced by military personnel. The Department of Veterans Affairs and Department of Defense completed and continue to conduct health studies associated with respiratory exposures. To evaluate potential respiratory diseases associated with historical exposures, we conducted epidemiological studies, with and without associated clinical studies, from 2001 to the present,.

Thank you for your continued support for the health and well-being of our Service members, veterans, and their families. I am sending identical letters to the other congressional defense committees.

Sincerely,

//SIGNED//

Matthew P. Donovan

US Under Secretary of Defense for P&R

Enclosure:
As stated



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The Honorable Jack Reed
Ranking Member
Committee on Armed Services
United States Senate
Washington, DC 20510

Dear Senator Reed:

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The Honorable Adam Smith
Chairman
Committee on Armed Services
U.S. House of Representatives
Washington, DC 20515

Dear Mr. Chairman:

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The Honorable William M. "Mac" Thornberry
Ranking Member
Committee on Armed Services
U.S. House of Representatives
Washington, DC 20515

Dear Representative Thornberry:

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The Honorable Richard C. Shelby
Chairman
Subcommittee on Defense
Committee on Appropriations
United States Senate
Washington, DC 20510

Dear Mr. Chairman:

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JUN - 5 2020

The Honorable Richard J. Durbin
Vice Chairman
Subcommittee on Defense
Committee on Appropriations
United States Senate
Washington, DC 20510

Dear Senator Durbin:

The enclosed report is in response to Senate Report 116-103, page 239, accompanying S. 2474, the Department of Defense Appropriations Bill, 2020, detailing the scope and impact of respiratory illness on military personnel—particularly on deployed troops—dating from the first Gulf War to the present.

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JUN - 5 2020

The Honorable Peter J. Visclosky
Chairman
Subcommittee on Defense
Committee on Appropriations
U.S. House of Representatives
Washington, DC 20515

Dear Mr. Chairman:

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Matthew P. Donovan

US Under Secretary of Defense for P&R

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cc:
The Honorable Ken Calvert
Ranking Member



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JUN - 5 2020

The Honorable Ken Calvert
Ranking Member
Subcommittee on Defense
Committee on Appropriations
U.S. House of Representatives
Washington, DC 20515

Dear Representative Calvert:

The enclosed report is in response to Senate Report 116-103, page 239, accompanying S. 2474, the Department of Defense Appropriations Bill, 2020, detailing the scope and impact of respiratory illness on military personnel—particularly on deployed troops—dating from the first Gulf War to the present.

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Report to Congressional Defense Committees



June 2020

Senate Report 116-103, Page 239, Accompanying S. 2479, the Department of Defense Appropriations Bill, 2020, “Warfighter Respiratory Health”

The estimated cost of this report or study for the Department of Defense (DoD) is approximately \$4,400 in Fiscal Year 2020. This includes \$2,000.00 in expenses and \$2,400.00 in DoD labor.
Cost estimate generated on Feb 14, 2020 RefID: 0-35BAD9F

I. Congressional Reporting Request

This report is in response to Senate Report 116-103, page 239, accompanying S. 2474, the Department of Defense (DoD) Appropriations Bill, 2020, that requests the Assistant Secretary of Defense for Health Affairs provide a report to the congressional defense committees detailing the scope and impact of respiratory illness on military personnel – particularly on deployed troops – dating from the first Gulf War (1990) to the present.

II. Scope and Impact of Respiratory Illness in Service Members

Executive Summary

The scope of respiratory illnesses among military personnel is measurable by subjective surveys and objective methods such as epidemiology, research, and health surveillance of health care encounters and outcomes associated with respiratory symptoms among Service members. The range of respiratory illnesses include both infections and non-infectious conditions of the upper and/or lower respiratory tract. Impacts range from acute illnesses associated with newly-emerging diseases such as the coronavirus disease 2019 and annual influenza and colds that temporarily limit daily activity, to more chronic illnesses that could result in hospitalization and, in some cases, a deployment-limiting condition or medical disability and separation from military service. Researchers from the DoD and Department of Veterans Affairs (VA) have measured the scope, range, and impact of respiratory illnesses among military personnel using subjective and objective methods in previous, ongoing, and future efforts that are summarized in this report.

There are some Service members and veterans who have ongoing respiratory symptoms and/or diagnoses of chronic respiratory conditions (asthma, emphysema, chronic bronchitis, and other less common conditions) that may be associated with their deployment to Southwest Asia, U.S. Central Command area of responsibility. The U.S. Armed Forces have had a continuous presence in the region since the Iraqi invasion of Kuwait in August 1990. Occupational, environmental, and uniquely military exposures have been described in the medical and public health literature and demonstrate the range of potential and actual exposures expected for the location, activities, and timeframe.

High levels of ambient particulate matter (PM) were identified as a potential threat to respiratory health early in Operation IRAQI FREEDOM in 2003.¹ Sampling conducted by preventive medicine personnel deployed to Southwest Asia typically demonstrated levels of PM above those considered healthy by the U.S. Environmental Protection Agency's National Ambient Air Quality Standards. U.S. sources of fine particles (<2.5 µm) include emissions generated by motor vehicles and coal-fired power plants. Generally, the major contributor to PM in Southwest Asia is resuspension of dust and soil from the desert floor. Airborne hazards created by open-air burn pits constitute a significant source of waste disposal produced by the U.S. military to

¹ Desert Research Institute. DoD Enhanced Particulate Matter Surveillance Program. Reno, NV: DRI; 2008. Final Report.

dispose of solid waste. Burn pit emissions contributed to the total amount of pollutants (e.g., fumes, vapors, gases, and PM) to which deployed personnel were exposed. Emissions from burn pits likely varied over time and between locations because of heterogeneity in the trash burned that may have produced variable levels of PM, metals, volatile organic compounds, and polycyclic aromatic hydrocarbons.² Exposures from chemicals associated with ongoing military-related, industrial activities (e.g., petroleum, oil, lubricants, and vehicle exhaust) from both occupational and environmental perspectives also contributed to total airborne exposures to Service members over the past 30 years. Thus, individual exposure to burn pit emissions and industrial activities likely varied by individual and group activity patterns and their locations relative to burn pits and industrial areas, as well as ambient meteorological conditions.³

This report describes previous and ongoing efforts that address the Committee’s request to “[detail] the scope and impact of respiratory illness on military personnel particularly on deployed troops dating from the first Gulf War to the present.” In doing so, this Report also indicates that ongoing and future activities of the DoD and VA are in line with the Committee’s inclusion of respiratory health as part of the Peer-Reviewed Medical Research Program (PRMRP). Furthermore, this Report views development of a comprehensive, broad-based warfighter respiratory research program as necessary to support overall force health readiness.

This Report provides an overview of previous, ongoing, and future efforts to evaluate adverse health effects experienced by Service members associated with deployment-related environmental exposures (Section III). Last year’s report included a specific section devoted to epidemiology that discusses respiratory illnesses experienced by Service members who served in Southwest Asia from 1990 to 2018 (Reference: Report to Congressional Defense Committees).⁴

In language from Senate Report 116–103, page 239, accompanying S. 2474, the Department of Defense Appropriations Act, 2020, “it is estimated that respiratory diseases affect more than 100,000 Service members each year and result in almost 27,000 lost workdays per year” The reference for this statement appears to have been cited from a paper by Sanchez et al., 2015.⁵ Sanchez’s paper was focused on acute respiratory illnesses in military recruits during their military training, and did not include Service members during or after deployments. According

² Institute of Medicine. Long-Term Health Consequences of Exposure to Burn Pits in Iraq and Afghanistan. Washington, DC: National Academies Press; 2011.

³ Ciminera P, Baird CP, Eschenbacher W, Harkins DK. Overview of Airborne Hazards in Operation Enduring Freedom, Operation Iraqi Freedom, and Operation New Dawn. Baird CP and Harkins DK, editors. Airborne Hazards Related to Deployment. Fort Sam Houston, Texas: Borden Institute, US Army Medical Department and School; 2015.

⁴ Under Secretary of Defense for Personnel and Readiness (USD(P&R)). Report to Congressional Defense Committees. Senate Report 115-290, page 212, to accompany S. 3159, the Department of Defense Appropriations Bill, 2019, “Warfighter Respiratory Health”, July 2019.

⁵ Sanchez JL, Cooper MJ, Myers CA, Cummings JF, Vest KG, Russell KL, Sanchez JL, Hiser MJ, Gaydos CA. 17 June 2015. Respiratory infections in the U.S. military: recent experience and control. Clin Microbiol Rev doi:10.1128/CMR.00039-14.

to Sanchez, acute respiratory illnesses in this cohort of military recruits are largely associated with seasonal influenza and colds, rather than associated with environmental exposures.

Individual Medical Readiness (IMR), used to identify deployability of personnel, is generally not adversely affected by acute respiratory illnesses.⁶ In other words, while respiratory illnesses may temporarily limit Service members daily activities, they typically are not deployment-limiting medical conditions that would prevent Service members from deploying after recovery. Deployment-limiting conditions, however, significantly impair performance of duties by Service members in a deployed environment.⁷ In general, Service members with pre-existing medical conditions such as asthma may be deployed based on a pre-deployment medical assessment. A medical condition may be considered as deployment-limiting according to its severity (e.g., a worse form of an acute disease of greater severity) or chronicity (e.g., long-term illnesses or conditions or medical conditions of indefinite duration). This “disability evaluation system” and individual Military Department’s service retention determinations are used to evaluate whether a medical condition precludes a Service member’s ability to perform his/her essential duties during deployment potentially in a combat environment.⁸

III. Overview of Previous, Ongoing, and Future Efforts to Evaluate Health Impacts from Deployment-Related Airborne Exposures: Exposure Assessment, Health, and Toxicology

A. DoD and VA Activities. The DoD and VA work jointly to review and synchronize research efforts, improve real-time exposure monitoring of deployed forces, communicate information about the Airborne Hazards and Open Burn Pit Registry (AHOBPR) to Service members and veterans, and best integrate exposure-related information into each Service member’s Individual Longitudinal Exposure Record (ILER) currently under development. These activities are aligned with the PRMRP and incorporate recommendations from the Defense Health Board’s (DHB) February 2015 report, “Deployment Pulmonary Health,” and elsewhere.

The DHB report focused on: 1) establishing pre-deployment clinical baselines and post-deployment screening for chronic pulmonary symptoms and disease; 2) diagnosis of pulmonary disease; 3) surveillance for deployment-related pulmonary disease; 4) deployment pulmonary health registries; 5) deployment pulmonary health research activities; and 6) prevention of deployment-related pulmonary disease.⁹ In 2015, a textbook summarizing the state of scientific, medical and public health knowledge on airborne exposures and characterization, population surveillance, health communication and outreach and research initiatives was published. Much

⁶ Department of Defense Instruction (DoDI) 6025.19, “Individual Medical Readiness (IMR),” June 9, 2014.

⁷ DoDI 6490.07, “Deployment-Limiting Medical Conditions for Service Members and DoD Civilian Employees,” February 5, 2010.

⁸ DoDI 1332.18, “Disability Evaluation System (DES),” August 5, 2014, as amended; DoDI 1332.45, “Retention Determinations for Non-Deployable Service Members,” July 30, 2018; and Military Department Policies.

⁹ Defense Health Board. Deployment Pulmonary Health. February 11, 2015 retrieved on June 6, 2019 at <https://health.mil/Reference-Center/Reports/2015/02/11/Deployment-Pulmonary-Health>.

of the work described in this influential publication was based on research performed by the DoD, the VA and academic institutions.¹⁰ The DoD and VA will continue to update policies and procedures based on the outcomes of peer-reviewed publications, up-to-date and on-going research, and experiences obtained from evidence and science-based clinical practice.

B. Institute of Medicine (IOM; renamed the National Academy of Medicine in 2015). The IOM and the National Academy of Sciences, Engineering, and Medicine published a series of 11 reports on various Gulf War and Health topics from 2000-2018. In addition, the IOM formed a Committee to determine the long-term health effects from exposure to burn pits. The IOM Committee published its findings in a report, “Long-Term Health Consequences of Exposure to Burn Pits in Iraq and Afghanistan,” in 2011. The IOM concluded that there was inadequate/insufficient evidence of an association between exposure to combustion products and cancer, respiratory disease, circulatory disease, neurologic disease, and adverse reproductive and developmental outcomes in the populations studied and studies summarized. The IOM also concluded that there was limited/suggestive evidence of an association between exposure to combustion products produced by open burn pit use and reduced pulmonary function in populations exposed to open burn pits.

In March 2019, the first meeting of the National Academy of Medicine’s Committee on the Respiratory Health Effects of Airborne Hazards Exposures in the Southwest Asia Theater of Military Operations was held. The charge to the Committee was to “comprehensively review, evaluate, and summarize the available scientific and medical literature regarding the respiratory health effects of exposure to airborne hazards encountered during service in the Southwest Asia Theater of military operations.”¹¹ The final report, along with associated conclusions and recommendations will be released in July 2020.

C. PRMRP Update. The Fiscal Year (FY) 2019 PRMRP provided funding for several Respiratory Health and Injury areas of investigation to include: acute lung injury, burn pit exposure, constrictive bronchiolitis, lung injury, metals toxicology, pulmonary fibrosis, and respiratory health.¹² On January 10, 2020, the Defense Health Program DoD PRMRP announced its “Anticipated Funding Opportunities for FY 2020.” Burn pit exposure, constrictive bronchiolitis, metals toxicology, and respiratory health were included in the FY 2020 PRMRP congressionally-directed areas of research.¹³

¹⁰ Baird CP and Harkins DK, editors. Airborne Hazards Related to Deployment. Fort Sam Houston, Texas: Borden Institute, US Army Medical Department and School; 2015.

¹¹ National Academy of Sciences, Engineering, and Medicine. Committee on Respiratory Health Effects of Airborne Hazards Exposures in the Southwest Asia Theater of Military Operations. Activity describe at: <http://www.nationalacademies.org/hmd/Activities/Veterans/RespiratoryHealthEffectsofAirborneHazardsExposures.aspx>.

¹² PRMRP Strategic Plan, <https://cdmrp.army.mil/prmrp/pbks/PRMRP%20Strategic%20Plan.pdf>.

¹³ FY20 PRMRP Announcement: <https://cdmrp.army.mil/pubs/press/2020/20prmrppreann>.

D. American Thoracic Society (ATS) Workshop. The ATS held a workshop in May 2018 that included an expert panel of 25 individuals across academia and the U.S. Government.¹⁴ The focus of the workshop was to evaluate potential adverse health effects associated with inhalation exposures during land-based, U.S. military deployments to Afghanistan and Southwest Asia. The ATS workshop reviewed epidemiologic studies that indicated higher rates of encounters for respiratory symptoms post-deployment compared with non-deployers and for airway diseases, primarily reactive airway diseases such as asthma. Case series studies describing post-deployment dyspnea, asthma, and a range of other respiratory tract findings were also presented at the Workshop. Workshop participants had varying opinions about the definition and frequency of constrictive bronchiolitis and other small airway pathologic findings in deployed populations. The workshop concluded that the relationship of airway diseases, including constrictive bronchiolitis, to exposures experienced during deployment needs to be better defined. Participants recommended that future clinical and epidemiologic research efforts: (1) provide better characterization of deployment exposures to potentially toxic airborne substances; (2) carry out longitudinal assessments of potentially related adverse health conditions, including lung function and other physiologic changes; and (3) use rigorous histologic, exposure, and clinical characterization of patients with respiratory tract abnormalities.

E. Summary of Ongoing Activities. Self-reported symptoms and exposures to health hazards are captured in DoD Post-Deployment Health Assessments (PDHAs). The annual Periodic Health Assessment summarized in DD Form 3024, includes questions about asthma, wheezing, shortness of breath, difficulty breathing and other lung problems, as well as tobacco use and smoking history, for all Service members. The PDHA summarized in DD Form 2796 and Post-Deployment Health Re-Assessment (PDHRA) summarized in DD Form 2900 include health care provider review of self-reported responses to questions that pertain to potential adverse respiratory effects from toxic substances including airborne hazards from oil burn pits. PDHAs and PDHRAs include questions about wheezing, shortness of breath, difficulty breathing (other than asthma), coughing, and the open-ended question, “Are you worried about your health because you believe you were exposed to something in the environment while deployed? If yes, please explain.”

DoD Serum Repository (DoDSR). Beginning in 1990, serum has been collected for studies of association with the results of periodic HIV testing (i.e., remaining serum after routine HIV-1 antibody testing is added to the DoDSR), and also collected from Service members before and after major deployments.¹⁵ These serum collections are stored in the DoDSR and used to conduct epidemiologic studies and inform health policy. The DoDSR now includes over 62 million samples from more than 11 million Service members and may serve as an additional

¹⁴ Garshick, E, Abraham JH, Baird CP, Ciminera P, Downey Gregory P, Falvo MJ, Hart JE, Jackson DA, Jerrett M, Kuschner W, Helmer DA, Jones KD, Krefft SD, Mallon T, Miller RF, Morris MJ, Proctor SP, Redlich CA, Rose CS, Rull RP, Saers J, Schneiderman AI, Smith NL, Yiallourous P, Blanc PD. *Ann Am Thorac Soc* Vol 16, No 8, pp e1–e16, Aug 2019, available at: <https://www.atsjournals.org/doi/full/10.1513/AnnalsATS.201904-344WS>.

¹⁵ Rubertone MV, Brundage JF. The Defense Medical Surveillance System and the Department of Defense Serum Repository: Glimpses of the Future of Public Health Surveillance. *Am J Public Health*. 2002 December; 92(12): 1900–1904.

means to identify chemical compounds and molecular changes (e.g., serving as the basis of future research based on genomics, proteomics or metabolomics) associated with various potentially toxic environmental exposures.¹⁶

Additional Activities. The DoD is also evaluating additional approaches to evaluate airborne exposures (e.g., collecting air samples in areas of deployment), lab studies to determine associated doses (e.g., bioassays) sampling and assessment from refined areas, and integration of individual sampling techniques/technologies. Deployment health assessment data is collected in the Defense Medical Surveillance System and is available for ongoing and future epidemiologic studies of Warfighter Respiratory Health. Prospective cohort studies (e.g., the Millennium Cohort Study)¹⁷ and follow-up of participants enrolled in the AHOBPR may also provide additional epidemiologic and laboratory data regarding the development of deployment-related respiratory and other health conditions.

IV. Conclusions

The DoD and VA will continue to update policies and procedures based on science and evidence-based practice, studies described in peer-reviewed publications, and the results of epidemiologic studies and laboratory research. As described in Section III, there are a number of independent DoD and VA Deployment Health-related activities and research initiatives that are being conducted in close concert and coordination. Finally, the DoD will continue to utilize available data and resources to develop and refine Service member PDHAs, ILER, health studies, as well as making relevant respiratory health data available to researchers and healthcare providers.

¹⁶ Perdue CL, Cost AA, Rubertone MV, Lindler LE, Ludwig SL. Description and utilization of the United States department of defense serum repository: a review of published studies, 1985-2012. PLoS One 2015; 10: e0114857

¹⁷ Ryan MA, Smith TC, Smith B, Amoroso P, Boyko EJ, Gray GC, Gackstetter GD, Riddle JR, Wells TS, Gumbs G, Corbeil TE, Hooper TI. Millennium Cohort: enrollment begins a 21-year contribution to understanding the impact of military service. J Clin Epidemiol 2007; 60: 181-191