



CT Chest Imaging in Active-Duty Personnel with Multiple Southwest Asia Deployments

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Disclaimer

- The view(s) expressed herein are those of the author(s) and do not reflect the official policy or position of Brooke Army Medical Center, the Defense Health Agency, Department of War, nor the U.S. Government.
- The authors have no conflicts of interest.



Introduction

- Chronic respiratory symptoms are often reported after military deployment to southwest Asia.
- There remain concerns about multiple inhalation exposures such as burn pit smoke.
- Question has been raised about the increased risk of lung malignancies due to exposures.
- This study examined data collected from frequent deployers to determine chest imaging abnormalities.



NASEM, 2020

- Upper airway disorders (rhinosinusitis, OSA, VCD)
- Non-infectious lower airway (asthma, COPD, CB)
- Interstitial lower airway (AEP, HP, sarcoid)
- Infectious lower airway (bronchitis, pneumonia, TB)
- Respiratory cancers (head & neck, lung)
- “Of these outcomes, none met the criteria for sufficient evidence of an association. The evidence for respiratory symptoms—which included chronic persistent cough, shortness of breath (dyspnea), and wheezing—met the criteria for limited or suggestive evidence of an association”



Introduction

- Study linking state cancer registry data with deployment records for over 1.3 million 1st Gulf War veterans
- Lung cancer was the only malignancy showing a statistically significant excess among Gulf War deployers compared to non-deployers.
- Could reflect higher smoking rates among deployed personnel rather than a direct exposure effect.

Young HA, *Annals of Epidemiology*, 2010



Introduction

- A large retrospective cohort of 1.78 million post-9/11 veterans
- Modestly increased risks of cancers
 - Transitional cell carcinoma (OR 1.19)
 - Head and neck cancer (OR 1.17)
 - Female breast cancer (OR 1.13)
- Lung cancer was not among the cancers with significantly elevated risk in this cohort.

Ma H, *Military Medicine*, 2025



Introduction

- A large cohort study of 459,381 OEF/OIF veterans with prolonged deployment to bases with open burn pits
- Increased odds of asthma (adjusted OR 1.01 per 100 days) and COPD (adjusted OR 1.04 per 100 days)
- Cancer mortality was not associated with burn pit deployment duration.

Robertson I, *JAMA Open Network*, 2025



Methods

- Senior military personnel with multiple deployments were referred to Brooke Army Medical Center for a standardized evaluation determining overall fitness for duty.
- Participation began in 2018 with repeat evaluations every 3-4 years in selected individuals
- Baseline pulmonary function testing
- Coronary CT imaging with partial lung parenchymal views
- Maximal cardiopulmonary exercise testing



Methods

- CT imaging reports reviewed
 - Major abnormalities
 - Lung nodules > 6 mm
 - Lung nodules < 6 mm
 - Minor parenchymal abnormalities



Demographics

- 318 individuals (482 CT images)
- Age = 53.6 ± 3.4 years
- Mean number of deployments = 5.0 ± 3.2
- Months deployed = 37.5 ± 21.5
- Gender = 91% male
- BMI = 26.8 ± 3.0 kg/m²
- Body fat percentage = $27.3 \pm 6.0\%$
- Smoking history = 16.3%



PFT/CPET

FEV ₁ (% pred)	101.7 ± 13.3
FVC (% pred)	100.7 ± 11.4
FEV ₁ /FVC	78.8 ± 6.1
MWV (% pred)	109.6 ± 3.2
VO ₂ peak (% pred)	121.1 ± 18.8
VO ₂ (AT) (% pred)	92.2 ± 19.2
HR max (% pred)	93.5 ± 7.8



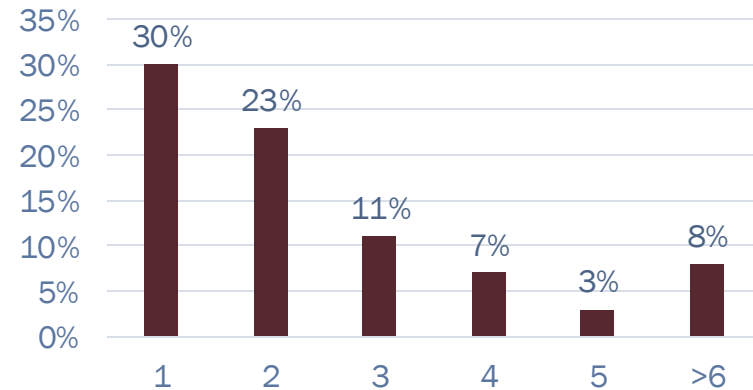
Significant CT Imaging

- Nodules/opacities > 8 mm (6)
 - 0.8 – 1.7 cm (all resolved)
- Lobar scarring/opacities (6)
- Air trapping/mosaicism (4)
- Ground-glass opacities (3)
- Bronchiolitis/bronchiectasis (2)
- Elevated hemidiaphragm (1)
- Pleural lipoma (1)



Nodules (6 mm)

- 264 (55%) with no nodules
- 218 (45%) with nodules
 - 1 nodule = 65 (30%)
 - 2 nodules = 50 (23%)
 - 3 nodules = 24 (11%)
 - 4 nodules = 16 (7%)
 - 5 nodules = 6 (3%)
 - 6 or more nodules = 18 (8%)



Discussion - STAMPEDE III

- Multifactorial causes of dyspnea
- Significant non-pulmonary co-morbidities
- Primary disorders
 - Asthma (23%)
 - Airway hyperreactivity (15%)
 - Upper airway disorders (11%)
- Diffuse lung disease uncommon
- 30% with a normal evaluation

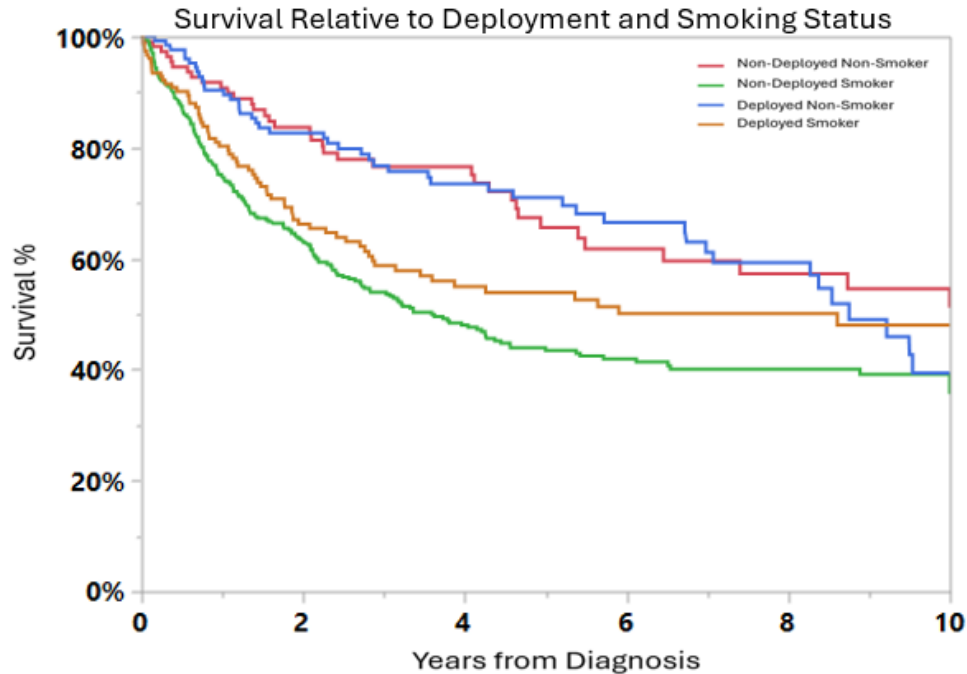


Discussion - JPC Pathology

- Lewin-Smith MR, et al. Pulmonary pathology diagnoses in the US military during the global war on terrorism. *Lung* 2021; 199:345-355.
- Joint Pathology Center – 2006 to 2015
- 404 deployed; 2006 non-deployed
- No increased prevalence in neoplastic diagnoses
- Significant increased prevalence of organizing pneumonia in the non-deployed
- Increased prevalence of small airways disease, constrictive bronchiolitis, and hypersensitivity pneumonitis in the deployed (5% of all biopsies)



Discussion – Deployment Lung Cancer



RAND Report

- *Respiratory Health Among U.S. Veterans Across Age and Over Time*
- RAND Epstein Family Veterans Policy Research Institute
 - “Veterans who served during periods of peace had a similar prevalence of respiratory disease diagnoses and symptoms as veterans who served during wartime.”
 - “Differences in adult smoking behaviors are estimated to account for 20 percent to 25 percent of the differences in respiratory health outcomes between veterans and civilians.”



Conclusion

- Long-term outcomes in deployed military personnel are essential to assess impact of environmental exposures on respiratory health.
- Due to increased tobacco exposure in deployed settings, this may potentially raise risk with concomitant airborne pollutants.
- Risk of lung cancer not substantiated in this population even with reported smoking history and nearly 3 years of deployment.



Conclusion

- Approximately one-quarter of VA patients aged 50–80 meet USPSTF lung cancer screening eligibility criteria based on smoking history alone, representing over 1 million veterans.
- Incorporating military exposure history into risk assessment.
- Current criteria may exclude veterans with significant exposures.
- Further long-term follow-up is needed to assess increased risk



Acknowledgements

- Mateo C. Houle, MAJ, MC, USA
- Christopher Lisanti, Col (ret), USAF, MC
- Luke S. Janowiak, COL (ret), MC, USA

