

BURN PITS (TRASH AND HUMAN WASTE EXPOSURES)

A Resource for Veterans, Service Members, and Their Families

Introduction

Exposure to burning trash and human waste, including feces, is a Veteran concern for those recently returned from Operation Enduring Freedom and Operation Iraq Freedom (OEF/OIF). Proper disposal of waste during deployment is essential to prevent health problems and protect service members. In certain situations, when sanitary and waste management facilities are unavailable, this waste may be burned in an open pit. Pits used for this purpose are referred to as “burn pits.”

Low burn temperatures in an open pit often result in smoldering conditions and incomplete combustion of substances. This, in turn, may generate many pollutants including: particulate matter, polycyclic aromatic hydrocarbons (PAHs), volatile organic compounds including carbon monoxide, and ash. Other substances that may be released into the air from an open burn pit can include chemicals such as: dioxins like benzene and hexachlorobenzene, heavy metals such as arsenic, and respiratory irritants such as: formaldehyde, hydrogen cyanide, nitrogen dioxide, and sulphur dioxide.

Since any particular trash burn is made up of several materials, it can result in different types, mixtures, and quantities of chemicals released in the smoke. Because of this, it is difficult to quantify the levels of exposure an individual service member may have had to the smoke and chemicals. Exposure is also dependent on how close someone is to the burn pit, which way the smoke is blowing, and how long and how often they are exposed. There is little actual testing data that has measured levels of possible toxins in individual service member’s breathing environment(s).

Health Effects

Health effects from exposure to smoke from burning waste is dependent on many factors including: the nature of the

waste being burned, the duration of exposure (number of hours and days and whether they are consecutive or not), the temperature of the burn and the use of accelerants, such as diesel fuel, how close to the burn smoke an individual is, and an individual’s medical history and their sensitivity to smoke. Soldiers who actually burned waste are more likely to be at greater risk for any health effects of the smoke than those who may have been further away but still in the general vicinity of the smoke. For example, due to their proximity, an individual that is billeted downwind from a burn pit has a greater potential exposure than one who is simply occasionally passing by.

Short-term

Many of the substances that may be released into the smoke plume from burning trash and waste are irritants and may cause short-term symptoms such as nausea, headaches and/or irritation of the eyes, respiratory tract, nose, and throat. This may result in burning, dry or tearing eyes, nasal congestion, sneezing, sore throat, cough, etc. For the majority of healthy soldiers, these irritant symptoms tend to resolve soon after exposure ends. Service members with pre-existing asthma or a natural tendency for asthma, chronic lung problems, or allergies may have respiratory symptoms for a longer period of time and/or a worsening of their pre-existing symptoms and lung problems from these exposures. Some of these

individuals may still have symptoms years after leaving the theater.

Based on the very limited scientific studies available to date, it appears that under some conditions, breathing smoke from burn pits may cause short-term irritant respiratory symptoms. One recent study by Smith et al. (2009) found that soldiers who served in a land-based deployment had an increased risk for self-reported pulmonary symptoms (persistent or recurring cough or shortness of breath) in comparison to soldiers who were deployed to sea. This implies that exposures related to ground combat, including burn pits, need to be further studied.

Long-term

High exposures to specific and individual chemical components of smoke may affect the: skin, respiratory system, eyes, liver, kidneys, central nervous system, cardiovascular system, reproductive system, peripheral nervous system, and gastrointestinal tract. Currently there is not enough medical or scientific information about the long-term health effects from exposures to low levels and mixtures of the chemicals that might be present in smoke from the burn pit. Again, it depends on the specific components of the smoke and their concentrations.

Results of existing studies of long-term health effects are conflicting. In one study, Veterans who served in Iraq/Afghanistan were 1.5 times more likely to develop new-onset asthma as compared to personnel assigned to the US (Szema 2010), but another study showed no significant increase in risk for asthma, emphysema, or chronic bronchitis (Smith et al, 2009). In a series of seven different studies performed in 2009 by the Armed Forces Health Surveillance Center (AFHSC) and the Naval Health Research Center (NHRC) that examined electronic medical record data of diagnostic codes, the studies generally showed little or no health impact on the long-term health of personnel assigned to burn pit locations several years post-deployment.

The US Public Health Command and the US Air Force Institute for Operational Health have conducted studies that tested air quality near several burn pits, including the burn pit at Joint Base Balad (formerly known as Balad Air Base), Iraq, which is the largest burn pit to have been used. Based on all the sampling done, these studies concluded that the levels of hazardous chemicals measured were mostly below the safe exposure standard set by the deployment health guidelines or any government agency, such as the US Environmental Protection Agency (US EPA) for air quality or the US Occupational Safety and Health Administration (OSHA) for workplace exposures. There were occasional readings above these levels but they were short lived and rare. The study concluded that it is unlikely that adverse long-term health risks will occur from these chemicals in persons who were exposed to burn pit smoke at the levels that were measured in those studies. Further scientific and medical information is still needed to better understand the risk of long-term health ramifications from exposure to multiple chemical substances at low levels.

In an attempt to improve our understanding of the possible long-term health effects from exposure to burn pit smoke, in November 2009, VA requested that the National Academy of Sciences' Institute of Medicine (IOM) conduct a study to determine the long-term health effects of exposure to burn pits in Iraq and Afghanistan. The report of that study is expected to be completed and available by summer 2011.

Given the length of most deployments and the intermittent nature of service members' exposures to smoke from burn pits, the likelihood that service members will have had appreciable exposures to cancer-causing chemicals, and thus suffer long-term health effects such as lung cancer, is expected to be low.

Constrictive Bronchiolitis & Sulfur Fires

In a 2007 study of soldiers with exposure to a large sulfur mine fire in Mosul, Iraq in 2003, 19 of 41 study participants were diagnosed with constrictive bronchiolitis

(inflammation of the lung tissue). While individual exposure levels cannot be accurately determined, the US Public Health Command (formerly known as the US Army Center for Health Promotion and Preventative Medicine) currently considers it possible that the condition could be associated with exposure to the 2003 Mishraq State sulfur fire event. It is not clear whether these studies are applicable to exposure to burn pits, but there are several groups of physicians, scientists and researchers, both within VA and DOD and outside of these agencies looking at this issue.

Your Health

Based on the information available to date, periodic and long-term health monitoring and medical follow-up are not recommended for Service members with routine exposure to burn pit smoke who have no

respiratory symptoms. Veterans who had high and/or frequent burn pit smoke exposure or who have ongoing respiratory symptoms and/or other medical conditions may require medical evaluation. At a minimum, any Veteran with pulmonary symptoms should have a two-view chest X-ray and complete pulmonary function testing, pre- and post-bronchodilator administration.

Veterans with questions or health concerns about exposure to deployment related smoke or any potentially toxic substances should talk to their VA primary care provider. This is especially true if they are experiencing symptoms that they believe are related to these exposures. If additional information or further clinical evaluation is needed Veterans can contact our WRIISC National referral coordinator at 1-202-461-1022 or visit our website at www.warrelatedillness.va.gov.

References

Websites

Deployment Health and Family Readiness Library

[deploymenthealthlibrary.fhp.osd.mil/products/Burning%20Trash%20and%20Human%20Waste%20%20\(313\).pdf](http://deploymenthealthlibrary.fhp.osd.mil/products/Burning%20Trash%20and%20Human%20Waste%20%20(313).pdf)

US Army Center for Health Promotion and Preventative Medicine

chppm-www.apgea.army.mil/documents/fact/65-035-0503.pdf

Deployment Health Clinical Center

chppm-www.apgea.army.mil/documents/FACT/Baladburnpit471208.pdf

Other

Epidemiological Studies of Health Outcomes among Troops Deployed to Burn Pit Sites (2010)

fhp.osd.mil/pdfs/100604_FINAL_Burn_Pit_Epi_Studies.pdf

Szema A, Peters M, Weissinger K, Gagliano C, Chen J. New-onset asthma among soldiers serving in Iraq and Afghanistan. *Allergy Asthma Proc.* 2010 Jul 30. [Epub ahead of print].

Smith, B, Wong, C, Smith, TC, Bokyo, EK, Gackstetter, Ryan, M for the Millennium Cohort Study team. (2009). Newly Reported Respiratory Symptoms and Conditions among Military Personnel Deployed to Iraq and Afghanistan: A Prospective Population-based Study. *American Journal of Epidemiology*, 170 (11), 1433-1442.