Conclusions: Dermal exposures to firefighters could be reduced by prompt washing following fireground exposure, the use of undergloves, and frequent laundering of personal protective gear such as gloves, hoods and coats. Further research is needed to better isolate the source of DEHP during the firefighting activities (e.g., knockdown vs. overhaul) in order to reduce exposures.

29. Determination of Polycyclic Aromatic Hydrocarbon levels in German Tunnel Workers Exposed to Diesel Exhaust

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Diesel exhaust emissions include levels of volatile organic compounds and particulates that can be harmful to the health of both humans and the environment. Polycyclic aromatic hydrocarbons (PAH) are just one of these particulates that can be absorbed through dermal contact, inhalation, or ingestion. Exposures to excess occupational amounts of diesel exhaust have been linked to an increased risk of lung cancer; however, research supporting to possibility of a connection between diesel exhaust and bladder cancer has yet to be agreed upon.

Objective: The current study examines the validity of using urinary 1-hydroxypyrene (1-HP) as a biomarker of exposure for diesel exhaust by determining a statistical association between levels of 1-HP and the presence of DNA adducts due to their necessity for tumor induction.

Method: Thirty urine samples from German tunnel workers were measured by analyzing the levels of 1-HP in worker's pre- and post-shift urine samples over a six week period. 1-hydroxypyrene was detected using HPLC fluorescence techniques. DNA adduct levels were measured in exfoliated urothelial cells using a ^{32}P-postlabelling assay. Each sample was coded and was only revealed after the analyses were complete.

Results: The values of 1-HP in urine were consistently higher in post-shift samples although none of the values were above the American Conference of Governmental Industrial Hygienists (ACGIH®) level of 1 µg/L. Tobacco smoking had a noted effect on the levels of DNA adducts but there was no observed statistically significant difference in 1-HP values. There was a positive correlation between levels of 1-HP and DNA adducts; however, the results were not deemed statistically significant. Although there were trends observed between 1-HP and DNA adduct levels, the lack of statistical power calls for further research in this area.

30. Effects of Faceseal Leakage, Flow Rate and Combustion Material on the Performance of Elastomeric Respirators with P-100 Filters

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Objective: To investigate the effects of faceseal leakage, breathing flow rate and combustion material on the overall particle penetration into one half-mask and one full-mask elastomeric respirator with P-100 filters used by firefighters.

Methods: The experiments were conducted in the University of Cincinnati exposure test chamber (3.6 X 2.4 X 2.6 meters, L x W x H). The respirators were tested on a breathing manikin exposed to aerosols produced by combustion of three materials (wood, paper, and plastic). The testing was performed under one constant flow (inspiratory flow rate = 30 L/min) and three cyclic flows (mean inspiratory flow rate = 30, 85, and 135 L/min). Four sealing conditions (unsealed, nose-only sealed, nose and chin sealed, and fully sealed) were examined to evaluate the respirator faceseal leakage. The total aerosol concentration was measured inside (C_{in}) and outside (C_{out}) of the respirator using a condensation particle counter. The total penetration through the respirator was determined as a ratio of the two ($P_{total} = C_{in} / C_{out}$). Analyses of Variance

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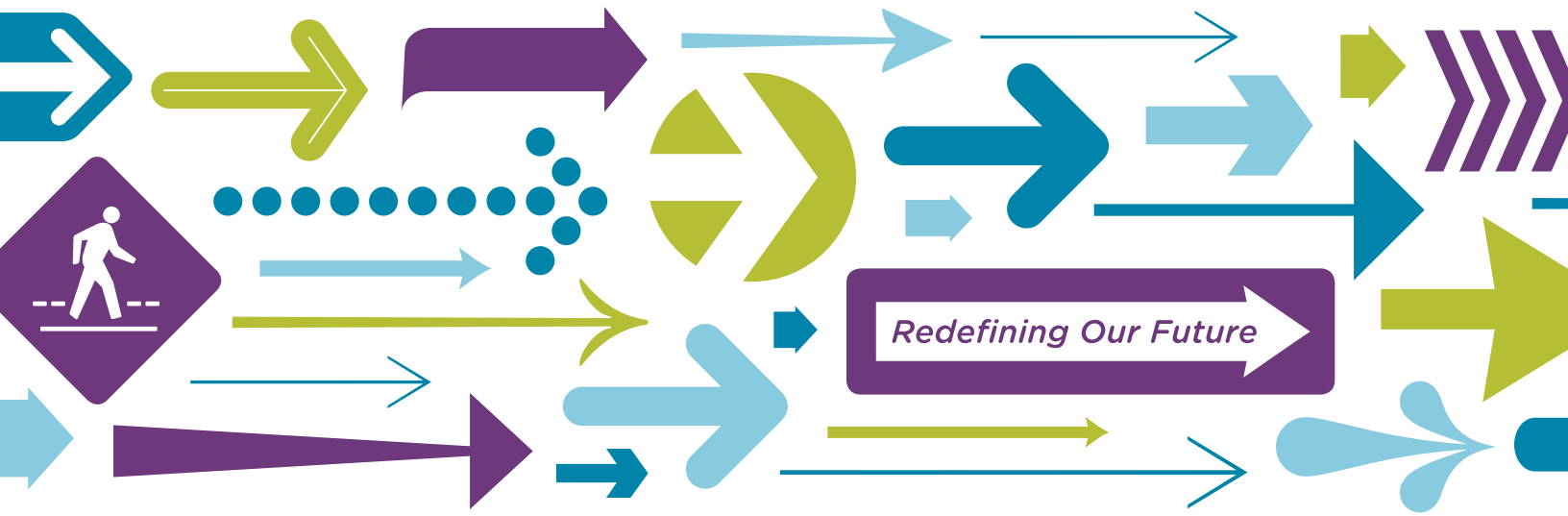

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