

## Evaluation of Peruvian Occupational Exposure to Polycyclic Aromatic Hydrocarbons by Urinary Biomarker Measurements

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This study was developed to examine occupational exposure of Peruvian workers to polycyclic aromatic hydrocarbons (PAHs) by measuring selected biomarker metabolites in urine. Twenty-two metabolites of seven PAHs and creatinine were measured in pre- and post-shift urine samples from 17 exposed and 9 control individuals. Occupational exposure consisted of individuals working as bus drivers, taxi drivers and policeman. Exposure would result from almost continuous driving through city streets and subsequent inhalation of exhaust. Due to the long work hours, pre-shift samples would be considered first morning voids while post-shift samples were spot samples.

Mean creatinine concentrations from pre- and post-shift samples were not significantly different. Creatinine levels were compared to PAH metabolite levels in both pre- and post-shift samples. Only selected PAH metabolites were positively associated with creatinine concentrations. It was interesting to find that different metabolites were associated with creatinine in the pre- and post-shift samples. All samples were creatinine normalized prior to further statistical analysis.

Likely due to the different sampling types (first morning void samples vs. spot samples), pre- and post-shift PAH metabolites were not significantly different for any of the metabolites measured in the exposed group. The exposed individuals had significantly higher fluorene and phenanthrene metabolite levels than the control group ( $p < 0.05$ ) with mean levels 0.7 to 3.1 times higher in both pre- and post-shift samples. Commonly measured biomarker compounds, pyrene and benzo(a)pyrene metabolites, were not significantly different between pre- and post-shift samples of the exposed individuals. Although levels of PAH metabolites were elevated compared to reference range concentrations established by NHANES for the US population, results were difficult to interpret due to limited sample numbers and confounding results from the different sample types analyzed.