**Investigating the Role of Polycyclic Aromatic Hydrocarbons (PAHs) on Cancer in Louisiana**

**Authors:** Amjila Bam1, Mohamed Mohamed1, Adrienne Katner2, Edward Trapido3, Evrim Oral1

**Affiliations:** 1LSUHSC School of Public Health BSDS Program

2LSUHSC School of Public Health EHCS Program

3LSUHSC School of Public Health EPPH Program

**Background:**

Polycyclic aromatic hydrocarbons (PAHs) represent a diverse group of environmental pollutants generated primarily through incomplete combustion processes. Their widespread presence in air, water, soil, and various consumer products has raised concerns about potential health risks, particularly their association with cancer development. It is difficult to assess the long-term effects of PAHs in humans directly. While increased incidences of lung, skin, and bladder cancers have been shown to be associated with occupational exposure to PAHs, evidential data for similar associations in non-occupational settings have been less persuasive.

**Objectives:**

This study aims to assess basic relationships between PAH chemical concentration exposure from air and some cancer types in Louisiana using census tract-level data.

**Methods:**

We used Louisiana Tumor Registry (LTR) data to obtain the 2022 census tract-level cancer incidence rates. Additionally, we utilized 2011 AirToxScreen data from United States Environmental Protection Agency (EPA) to derive the census tract-level total PAH concentrations. We dichotomized the total PAH concentrations into low versus high using the median value and compared age-adjusted cancer incidence rates, as well as unadjusted rates, between the PAH groups. All statistical analyses were conducted using SAS 9.4 (SAS Institute, Inc).

**Results:**

The total PAH concentration mean was 0.00201 mg/m3 (SD= 0.00080) from 1193 census tracts in Louisiana, with a median of 0.00187 mg/m3. We did not observe significantly different age-adjusted lung cancer incidence rates between the low (M=71.93, SD=16.70) and high (M=69.46, SD=20.63) PAH groups (*p*=0.06). Similarly, the age-adjusted bladder cancer incidence rates between the low (M=26.21, SD=5.80) and high (M=27.23, SD=8.01) PAH groups did not show statistically significant differences (*p*=0.49). We also found no significant difference in age-adjusted melanoma cancer incidence rates between the low (M=31.63, SD=10.06) and high (M=30.37, SD=7.60) PAH groups (*p*=0.47). However, the age-adjusted prostate cancer incidence rates were significantly higher (M=152.11, SD=36.18) in the high PAH group compared to the low PAH group (M=142.07, SD=35.53), with a p-value of 0.0039.

**Conclusions:**

Overall, while no significant differences were observed in lung, bladder, and melanoma cancer incidence rates between low and high PAH exposure groups, a notable exception was found in prostate cancer. The age-adjusted incidence rates for prostate cancer were significantly higher in areas with elevated PAH concentrations compared to those with lower levels. These findings suggest a potential association between PAH exposure and prostate cancer incidence, warranting further investigation into the mechanisms underlying this relationship and its implications for public health policies and interventions aimed at reducing PAH exposure.

No IRB was needed for this project