INCIDENCE OF SELECTED PULMONARY DISEASES DEPENDING ON THE EXPOSURE TO AMBIENT PM10.

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Objective: The main goal of the analysis was to assess the possible cancer risk from exposure to PM-bound PAHs generated from barbecue smoke.

Materials and methods: Three different types of fuel were used: liquid propane (LP), lump charcoal (LCh) and charcoal briquettes (ChB). $PM_{2.5-100}$ and $PM_{2.5}$ were collected. 16 PAH congeners were extracted from PM samples and measured quantitatively using GC chromatograph. The incremental lifetime cancer risk (ILCR) of people exposed by breathing to carcinogenic PAHs was assessed.

Results: Significant increase in PAH concentrations from grill powered by charcoal briquettes was observed. The total concentration of PAHs ranged from <0.0001 (LP) to 21.53 mg/m^3 (ChB). The daily exposure doses of $PM_{2.5}$ bound-BaPeq for typical grill master while grilling meat was 326.9 (LCh), 401.6 (ChB) and 0.04 (LP) ng/day. The inhalation-ILCR followed a lognormal distribution with a geometric mean of 5.57×10^{-5} in case of exposure to $PM_{2.5}$-bound PAHs emitted by unloaded gas grill and even 5.77×10^{-1} when grilling food above the charcoal briquettes. The risk for inhaling barbeque fumes for 5 hours/day, 40 days/year exceeded 10^{-3} USEPA acceptable level, suggesting high probability of cancer occurrences due to PAHs exposure.

Conclusion: This study shows that charcoal briquettes are most dangerous concerning inhalation exposure to PAHs from BBQ emissions. To protect against such risks we also recommend that EDmax for adult consumers should be less than 1 hour.