Conclusions: This presentation will assist audience members to pose the right questions; to select, evaluate, and fully leverage the potential for recent technological advances in science and engineering for environmental engineering; and, to benefit and expand the geographic and population scope of epidemiologic and environmental health studies.

Air Quality, Home Heating, and Well-Being under Beijing's Ban on Household Coal Burning

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OPS 02: Environmental epidemiology and policy, Room 315, Floor 3, August 28, 2019, 1:30 PM - 3:00 PM

Background/aim: In response to severe and persistent haze, the Chinese Air Pollution Prevention and Control Action Plan includes regional coal consumption caps in key northern regions. In Beijing, the municipal government has designated coal restricted areas throughout the province, offering subsidies to nighttime electricity rates and for electric-powered heat pumps to replace traditional coal heating stoves. We compared treated and untreated villages in the Beijing province to investigate three dimensions of outcomes of the policy: fuel use and economic behavior, subjective well-being, and indoor environmental conditions.

Methods: Our study design consists of 302 door-to-door surveys in six villages, with one treated and one un-treated village in each of three districts chosen to represent different socioeconomic and geographic conditions present in peri-urban Beijing. We measured indoor temperature and fine particulate matter levels (PM2.5) in a subset of homes in each village.

Results: Coal use was absent in treated villages in two districts, and significantly lower in the treated as compared with the untreated village in one district where adherence to the coal ban was not complete. In homes in the two coal-restricted villages adhering to the coal ban, average (standard deviation) outdoor-subtracted, indoor 24-h PM2.5 concentrations (0.145 (0.218) mg-m-3) were lower compared with untreated homes (0.275 (0.244) mg-m-3). In the middle-income district, where the transition to electric heating was complete, satisfaction with life (SWL) and satisfaction with living conditions (SWC) were higher (+0.6 and +1.0 on the 0–10 scale) in the treated village than the untreated. By contrast, in the least affluent district, both satisfaction measures were lower (-1.0, -1.5) in the treated village compared with the untreated.

Conclusions: Our results suggest that sudden household energy transition can be effective, given available technology for leap-frogging to high-efficiency electric heating, and generous public support for the program.

Health effects of exposure to aircraft noise: a cross-sectional study on adult residents near the Orio al Serio International Airport, Italy

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TPS 781: Health effects of noise, Exhibition Hall, Ground floor, August 27, 2019, 3:00 PM - 4:30 PM

Background and Aims: Noise pollution is an increasing problem in modern society and several studies have documented non-auditory health effects of aircraft noise. We performed a cross-sectional study in June-September 2013 among adults living near the Orio al Serio International Airport (Italy), to investigate the effects of aircraft noise on annoyance, sleep disorders, blood pressure levels, and hypertension. Methods: Residential addresses of subjects aged 45-70 years were geocoded and classified in three categories of noise levels: Reference Zone (<60 dBA),

Zone A (60-65 dBA), Zone B (65-75 dBA). Enrolled subjects underwent a personal interview (on demographics, clinical history, drug use, annoyance, sleep disorders, and noise exposure from different sources) and blood pressure (BP) measurements. We applied multivariable linear and robust Poisson regression models, adjusted for gender, age, education, BMI, cigarette smoking, last occupation, airport-related job, annoyance from road traffic noise, and anti-hypertensive drug use (analyses on BP only). Results: We enrolled 166 subjects in the Reference Zone, 164 in Zone A, and 70 in Zone B. Average levels of annoyance (either at day or night) from airport-related activities were higher than those from other sources and showed a trend across acoustic zones (+2.7 in Zone A, +4.0 in Zone B, p-trend < 0.001). Compared to referents, subjects in Zones A and B reported a greater frequency of sleep disorders in the month before the interview as well as in general (prevalence ratio: 1.34 in Zone A, 1.82 in Zone B, p-trend = 0.01). We did not highlight a relationship with BP levels or prevalence of hypertension across zones. Conclusions: The findings on noise-related subjective disorders suggest the need of further preventive actions, including structural interventions in houses (where needed), increased efforts to reduce aircraft noise, and the implementation of periodical monitoring programs of residents' health (adults and children).

Associations of dietary factors and oral health behaviors with plasma fluoride concentrations in children and adolescents aged 6 to 19 years

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TPS 771: Diet and lifestyle, Exhibition Hall, Ground floor, August 26, 2019, 3:00 PM - 4:30 PM

Background/Aim

Municipal water fluoridation is common in the US; however, fluoridation remains a contentious public health issue in some areas. In addition, non-drinking water sources of fluoride exposure in children and adolescents are poorly understood. We sought to describe the association between dietary factors and oral health behaviors with plasma fluoride concentrations using a nationally representative survey from the US.

Methods

We used data from 3,929 respondents aged 6-19 years old from the 2013—2016 National Health and Nutrition Examination Survey. We identified dietary factors using a 24-hour dietary recall and categorized types of foods and beverages consumed using US Department of Agriculture food group definitions. We characterized oral health behaviors using information on the timing of last dental visit, the number of tooth brushings per day, and amount of toothpaste used per brushing. We estimated associations between these factors and ln-transformed plasma fluoride concentrations after adjusting for sociodemographic factors and measured tap water fluoride, accounting for the complex survey design.

Results

The geometric mean plasma fluoride concentration was 0.36 μmol/L (95% confidence interval (CI): 0.34, 0.38). Children who drank tea (N=534, 14.1%; any variety) versus those who did not had 34% higher plasma fluoride concentrations (95% CI: 16, 54). Intake of other foods that may contain fluoride, including coffee, chicken nuggets, and grapes/raisins, were not associated with plasma fluoride concentrations, nor were oral health behaviors. For each 0.10 mg/L increase in tap water fluoride (median: 0.5 mg/L; interquartile range: 0.18-0.72), plasma fluoride was 4.9% higher (95% CI: 3.8, 6.0).

Conclusions

Our findings suggest tea consumption in children and adolescents may increase plasma fluoride concentrations substantially. Future studies should continue to investigate the contribution of diet and other behaviors to total fluoride exposure, which is critical to establishing safe levels of municipal water fluoridation.