**PM$_{2.5}$ COMPONENTS EXPOSURES AND CARDIAC AUTONOMIC FUNCTION: A PANEL STUDY OF TAXI DRIVERS**

Shaowei Wu, Department of Occupational and Environmental Health Sciences, Peking University School of Public Health, 38 Xueyuan Road, Beijing 100191, China, E-mail: wswmytnhao@bjmu.edu.cn

Furong Deng, Department of Occupational and Environmental Health Sciences, Peking University School of Public Health, Beijing, China

Jie Niu, Department of Heart Medicine, Peking University Third Hospital, Beijing, China

Qinsheng Huang, Department of Heart Medicine, Peking University Third Hospital, Beijing, China

Youcheng Liu, Department of Environmental and Occupational Health Sciences, School of Public Health, University of North Texas Health Science Center, Fort Worth, Texas, United States

Xinbiao Guo, Department of Occupational and Environmental Health Sciences, Peking University School of Public Health, Beijing, China

**Background and Aims:** Carbonaceous and metallic components of particles have been shown to play a role in particles’ effects on cardiac autonomic function as measured by heart rate variability (HRV). We previously reported the association of HRV with marked changes in traffic-related particulate air pollution around the Beijing 2008 Olympic Games in a panel of taxi drivers (Wu et al., 2010). We further investigated the relationship between exposures to the carbonaceous and metallic components of traffic-related particles and HRV in the same population.

**Methods:** Repeated measurements of in-car exposures to particulate matter $\leq 2.5 \mu$m in aerodynamic diameter (PM$_{2.5}$) and carbon monoxide were conducted in a group of 14 taxi drivers for one work shift in four study periods around the Beijing 2008 Olympics. The quantities of organic/elemental carbons and 27 elements of the traffic-related PM$_{2.5}$ mass were determined laboratorially. Linear mixed-effects models were used to evaluate the impact of exposures to different PM$_{2.5}$ components on HRV while controlling for potential confounders.

**Results:** Taxi drivers’ exposures to traffic-related PM$_{2.5}$ components showed dramatic changes across the four study periods around the Beijing 2008 Olympics. Differences in associations of traffic-related PM$_{2.5}$ components with HRV were found. An interquartile range (IQR: 917.9 ng/m$^3$) increase in calcium was associated with a 5.48 milliseconds [95% confidence interval (CI): 0.71, 10.24] increase in standard deviations of normal-to-normal (SDNN) intervals, whereas an IQR (4.1 ng/m$^3$) increase in nickel was associated with a 1.53 milliseconds (95% CI: 0.14, 2.92) increase in SDNN index. Additionally, a decline of 8.11 milliseconds (95% CI: -15.26, -0.97) in SDNN per IQR (481.4 ng/m$^3$) increase in iron was also found.

**Conclusions:** Our results support associations of PM$_{2.5}$ metallic components with cardiac autonomic function in the study population. Future studies are needed to clarify the interaction among different PM$_{2.5}$ components or the role of PM$_{2.5}$ mixtures.


**Grants Information:** This study was supported by Grants from the National Key Technologies R&D Program of China (No. 2006BAI19B06) and the National Natural Science Foundation of China (No. 81072267).