ABSTRACT: The aim of this research was to investigate cardiac autonomic changes associated with acute exposures to airborne particulates. Methods: High-fidelity 12-lead ECG (CardioSoft, Houston, TX) was acquired from 19 (10 male / 9 female) non-smoking volunteers (age 33.6 +/- 6.6 yrs) during 10 minutes pre-exposure, exposure and post-exposure to environmental tobacco smoke (ETS), cooking oil fumes, wood smoke and sham water vapor. To control exposure levels, noise, subject activity, and temperature, all studies were conducted inside an environmental chamber. Results: The short-term fractal scaling exponent ($\alpha_1$) and the ratio of low frequency to high frequency Heart Rate Variability (LF/HF) power ($\text{LF/\text{HF}}$) were lower in males ($p<0.036$, and $p<0.044$, respectively). Compared to pre-exposure ($p<0.002$) and sham exposure ($p<0.047$), male heart rates were elevated during early ETS post-exposure. Our data suggest that, in addition to tonic HRV gender differences, cardiac responses to some acute airborne particulates are gender related. Supported by Philip Morris USA.

BACKGROUND: Exposure to environmental tobacco smoke has been found to result in potentially harmful changes in autonomic balance (heart rate variability, HRV) controlling heart rates of non-smoking volunteers during two hours in airport smoking areas (Pope, 2003).

METHODS: Subjects: 19 (10 male / 9 female) non-smoking volunteers (age 33.6 +/- 6.6 yrs). Protocol: Seated subjects for 10 minutes pre-exposure, exposure and post-exposure conducted inside an environmental chamber in order to control exposure levels, noise, subject activity and temperature. Stimuli: Environmental tobacco smoke (ETS), cooking oil fumes, wood smoke and sham water vapor. Measurements: HRV was calculated using N=256 beats (sliding window configuration).

CONCLUSION: Our data suggest that, in addition to tonic HRV gender differences, cardiac responses to some acute airborne particulates are gender related.