FRESNO STATE
College of Health and Human Services

Bicyclists' Exposure to Particulate Matters in Indoor and Outdoor Air

Researchers:

- Jaymin Kwon, Assistant Professor, Department of Public Health, Fresno State
- Ashley Aliotti
- Melany Bunting
- Yai Xiong
- Ezechimere
- Nwachukwu
- Sally Lam
- James Davis
- Ku Lee
- Harshavardhan Deoghare

Abstract

Ambient air quality in Fresno has been an important environmental issue impacting public health for decades. People who stay outside for recreational activity are exposed to outdoor pollution. The exposures to multiple air pollutants were measured while young male adult participants riding stationary bikes in indoor and outdoor locations. PM2.5, ultrafine particles, and black carbon concentrations were measured using the real-time monitors. Personal exposures were measured inside of the South Gym of Fresno State and outside of the Fresno State Foundation near highway 168 for comparison.

PM2.5 concentrations were measured using Dust Trak DRX 8533 and 8534. Using CPC 3007, personal exposures to ultrafine particles were measured. MicroAeth AE51 collected the black carbon concentration. Temperature and humidity were recorded using sensors. The time-location data for each bicyclist was recorded hard copy. It is a within-group experimental design in which all subjects participate in the inside and outside stationary cycling. The heart rate, blood pressure, respiratory rate, pulmonary function testing via a spirometer were measured at baseline, during the test, post-test, and 4 hours after for each condition. Subjects cycled within an hour period under the same cycling protocol with cardiopulmonary and air pollution measurements throughout testing.

PM2.5 and ultrafine particle concentrations were significantly higher in outdoor air compared to levels measured in indoor air. Ultrafine particle concentrations were influenced immediately when wind was blown from smoke stack of the broiler restaurant nearby. The personal exposure to air pollution levels by location and time are being analyzed and will be compared.

Descriptions: Research Questions:

1. How different in particulate matter levels of indoor air and outdoor air in Fresno?
2. Can we observe adverse cardiopulmonary response associated with higher air pollution levels?
3. What would be the potential cardiopulmonary risks when people are exposed to particulate matters?