Background

• Long-term exposure to PM associated with increased deaths from heart and lung disease, including lung cancer
• Living near a major roadway associated with increased death from heart and lung disease
• Particle counts and black carbon increase by a factor of 30 near 405 and 710 freeways
• In-vehicle exposures important to overall exposure to vehicle-related pollutants
Heart Attack Study

- 691 heart attacks in Augsburg, Germany
- Activities for previous four days before heart attack
- Traffic exposure – time spent in cars, public transportation, motorcycles, bicycles
- Traffic exposure results in threefold increase in risk of heart attack within one hour

State Trooper Study

- Nine healthy North Carolina State troopers
- Studied 3 p.m. to midnight shift for 4 consecutive days
- In vehicle air pollutants measured, heart measurements, blood chemistry measured

State Trooper Study Results

- In-vehicle PM2.5 associated with:
  - changes in blood markers for inflammation and coagulation (up to 20%)
  - increase in heart rate variability
  - seen a few hours after exposure

- Most health endpoints associated with braking, accelerations, and possibly diesel emissions*

* Riediker et al. Cardiovascular effects in patrol officers are associated with fine particulate matter from brake wear and engine emissions, *Particle and Fibre Toxicology*, 1: 1-10, 2004.
Concluding Remarks

- Traffic exposure associated with heart attacks
- In-vehicle exposure to PM2.5 associated with heart disease risk factors
- ARB-funded study to determine if gasoline and diesel PM2.5 and ultrafine particles associated with health-related effects
- Diesel and other particle controls for vehicles will improve health for commuters and those living near roadways