

# Health Update

## Association Between Exposure to Traffic and Heart Disease

February 24, 2005



**Air Resources Board**  
**California Environmental Protection Agency**

# Background

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- 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



Peters et al., "Exposure to Traffic and Onset of Myocardial Infarction (MI)"  
*New England Journal of Medicine*. 351: 1721-1730, 2004

# 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



Riediker et al., "Particulate Matter Exposure in Cars is Associated with Cardiovascular Effects in Healthy Young Men" *American Journal of Respiratory and Critical Care Medicine*, 169: 934-940, 2004.

# State Trooper Study Results

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- In-vehicle PM<sub>2.5</sub> 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

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- Traffic exposure associated with heart attacks
- In-vehicle exposure to PM<sub>2.5</sub> associated with heart disease risk factors
- ARB-funded study to determine if gasoline and diesel PM<sub>2.5</sub> 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

