

Health Impacts of Fine Particle Components in California



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Air Resources Board

California Environmental Protection Agency



Background

- 8,200 deaths per year in California associated with exposure to fine PM (PM 2.5)
- Long-term and short-term exposure to fine PM associated with premature death and illness
- Are some particles more toxic than others?
- Which components of fine PM are associated with mortality?



Study Description

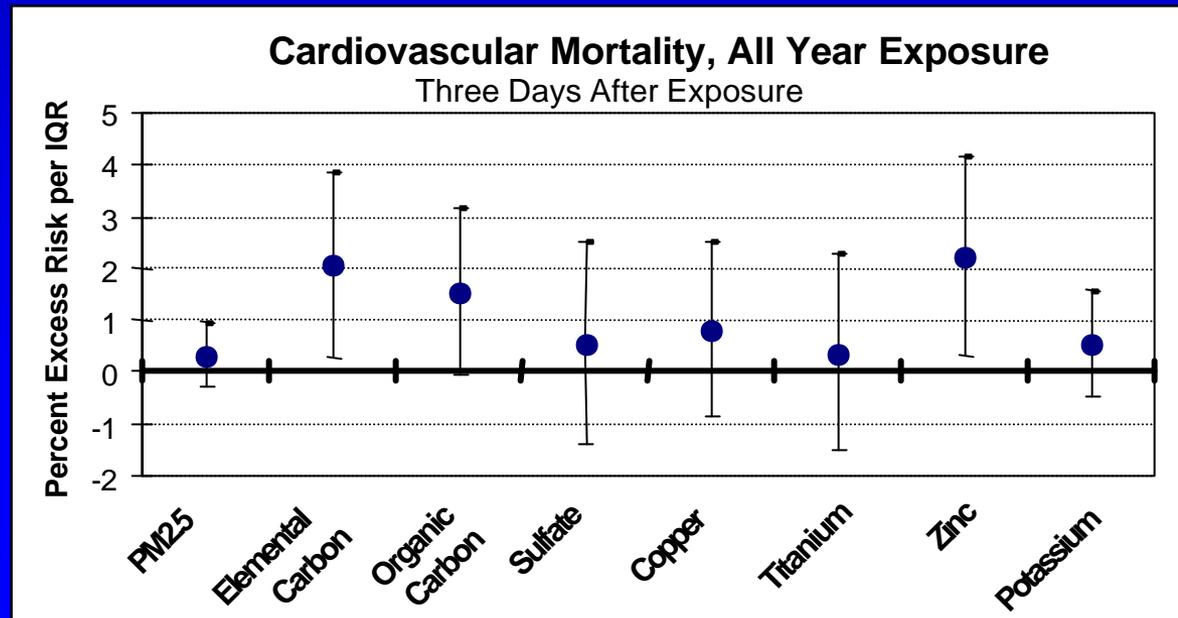
- PM mass and components: 2000 to 2003
- Cause of Death: all-causes, heart and lung disease, and all-cause for greater than 65 years old.
- Fresno, Kern, Riverside, Sacramento, San Diego, Santa Clara
 - 8.7 Million people, 25% of California's population
- Health effects measured up to 3 days after pollution episode



Ostro B, Feng W-Y, Broadwin R, Green S, Lipsett M. The Effects of Fine Particle Species on Daily Mortality and Morbidity in Six California Counties: Results from CALFINE. EHP, V115(1) 2007.

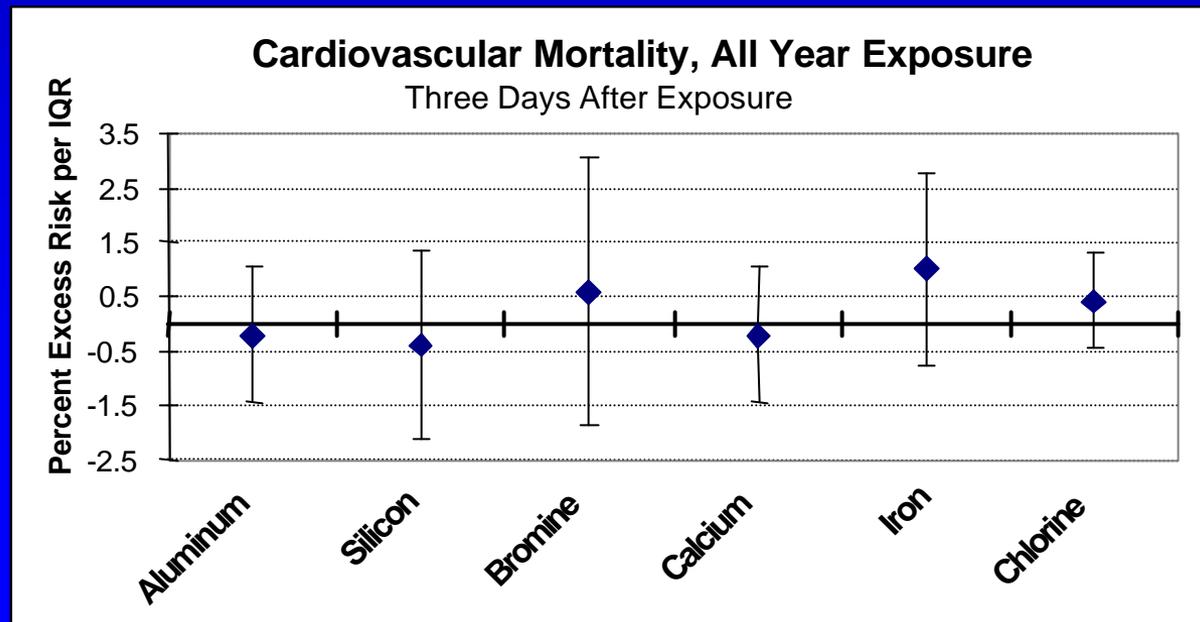
Study Results

- Elemental carbon, organic carbon, sulfate, metals
 - Found in fuel combustion and/or wood smoke
- All year: risk of cardiovascular mortality (1 – 2% per IQR)
 - All-cause mortality (0.5 – 1% per IQR)
- Cool Season: Higher risk of mortality (1 – 3% per IQR)



Study Results (con't)

- Aluminum, silicon, iron, bromine, calcium, chlorine
 - Found in soil or sea spray
- All year: No increased risk of cardiovascular mortality
- Cool season: No statistically significant increased risk of cardiovascular mortality except iron.



Conclusions and Implications

- Strongest association between premature death and fuel combustion components
 - Elemental carbon and organic carbon
 - Other mobile source related emissions
 - Metals
- Effects of PM-related mortality greater in cool season
- Implications for targeted regulations to reduce PM health effects in California

