Estimate of Premature Deaths Associated with Fine Particle Pollution (PM2.5) in California Using the U.S. Environmental Protection Agency Methodology

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Introduction
PM2.5 Health Impacts in California

- South Coast and San Joaquin Valley exceed the national PM2.5 standard
  - All Californians are exposed to PM2.5
- PM2.5 is a significant health risk, causing premature deaths
  - Scientific studies demonstrate health impacts occur even below the federal standard
  - Impacts occur whenever people are exposed, wherever they are

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New PM2.5 Report

- Answers the question: How many deaths are caused by PM2.5 exposure in California
- Applied USEPA methods to California
- Used California air pollution measurements from 90 monitoring stations throughout the State

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Clean Air Act Requirements

- USEPA sets national air pollution standards
  - Reviewed every 5 years
- Each state must meet national air quality standards
- Sanctions for failure to attain standards

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EPA PM2.5 Standard Review Process

1. Comprehensive review of more than 1000 studies
   - Found causal link between PM2.5 exposure and premature deaths
   - Completed: December, 2009

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U.S. EPA Science Assessment

"Collectively, the evidence is sufficient to conclude that the relationship between long-term PM2.5 exposures and mortality is causal."

- Highest Level of Certainty

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EPA PM2.5 Standard Review Process

2. **Risk assessment**
   - Developed numerical relationship between PM2.5 exposure and deaths
   - Found premature deaths caused by PM2.5 occur at levels as low as 5.8 micrograms per cubic meter
     - Federal standard is currently 15 micrograms per cubic meter
   - Completed: June, 2010

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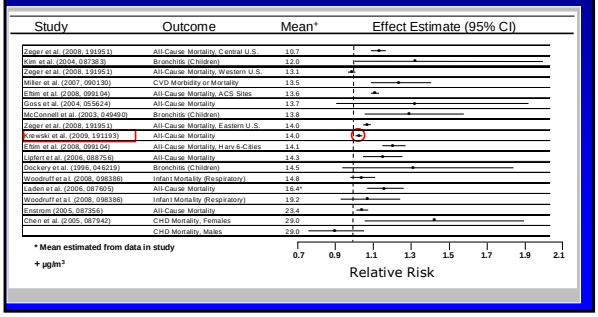
Summary of U.S. EPA Long-Term PM-Related Health Studies



* Mean estimated from data in study

+ µg/m³

USEPA Summary: Results

- Vast majority of studies show relationship between PM2.5 and premature mortality
- EPA selected risk factor from the Krewski study
- 63,000 to 80,000 deaths each year in the U.S. related to PM2.5
- Included estimates for Los Angeles and Fresno

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Core Health Study: American Cancer Society Study

- Reanalyzed and validated, peer reviewed
- Considers influence of smoking and other factors on premature death
- Krewski et al. (2009)
  - Most recent update
  - 18 years of follow-up
  - About 500,000 participants
  - 116 U.S. cities
  - Two exposure periods (1979-1983 and 1999-2000)

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Clean Air Scientific Advisory Committee (CASAC)

- Reviewed USEPA science assessment and risk assessment
- Supported conclusion that long-term exposure to PM2.5 is causally associated with mortality
- Supported risk assessment methodology

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The American Heart Association Reached Similar Conclusions

- Long-term exposure to PM2.5
  - Increases the risk for cardiovascular deaths
  - Reduces life expectancy
  - Reductions in PM levels are associated with decreases in cardiovascular deaths
- Overall evidence is consistent with a causal relationship between PM2.5 exposure and cardiovascular illness and death

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How Did ARB Apply the EPA Method?

- Used EPA method and risk factor to estimate deaths caused by PM2.5 exposure in California
  - Applied to California population
  - Used data from California statewide air monitoring network: 90 stations

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California Monitoring Sites

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Estimated Premature Deaths in California

- 9,200 premature deaths in California every year associated with exposure to PM2.5
  - Range of estimates: 7,300 - 11,000
- Meeting the current federal PM2.5 standard would avoid 2,700 deaths per year
  - Range of estimates: 2,100 – 3,300

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Comparison to Other Causes of Death

- In California (2007)
  - >200,000 deaths per year (all causes)
    - About 45% due to cardiopulmonary diseases
  - 11,000 deaths due to accidents
    - 4,000 deaths due to motor vehicles
  - 2,000 homicides

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Conclusions

- There is a causal link between PM2.5 exposure and premature deaths
  - Including at levels well below federal standards
- South Coast and San Joaquin Valley do not currently meet federal PM2.5 standards
- There are 9,200 deaths annually in California due to PM2.5 exposure
- Reducing PM2.5 emissions will reduce PM2.5 related deaths in California

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