Impact of Emission Reductions on Exposures and Exposure Distributions:

Application of a Geographic Exposure Model

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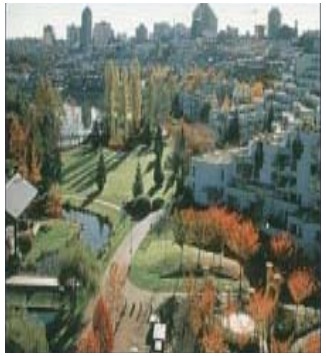


Issue

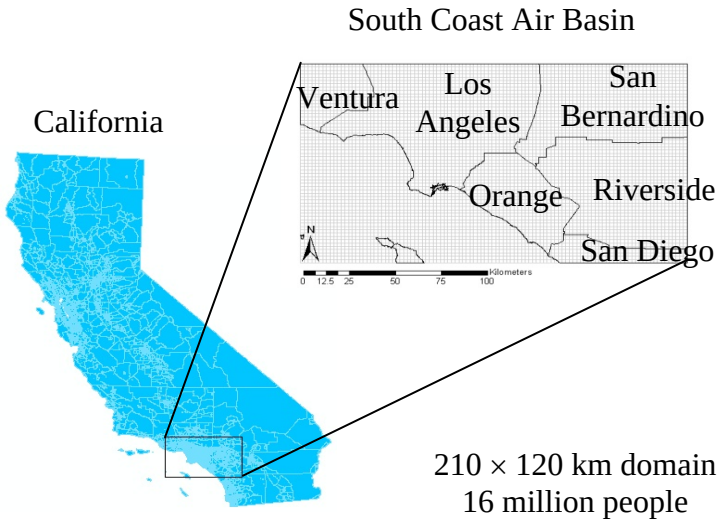
- Improving air quality involves prioritizing among sources
- Exposure and health impacts vary among sources
  - "Intake fraction"
- Exposure disparities (race/income)

Objectives

- Compare emission-reductions among sources:
  - Impact on average exposure
  - Impact on exposure distributions
- Policy/management implications

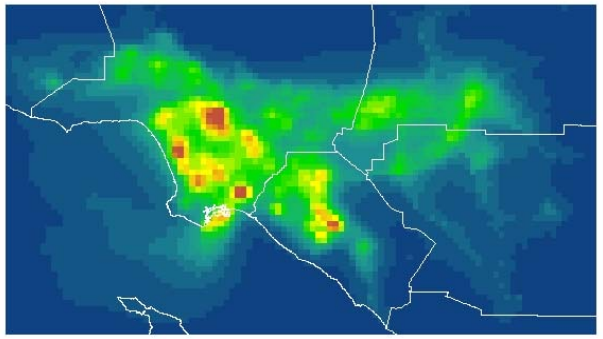
Approach

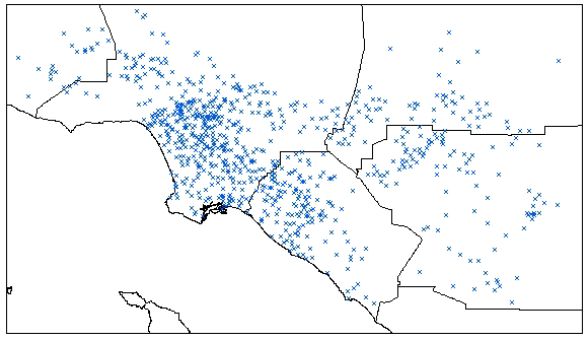
- Exposure model (25,000 people) for California's South Coast
- Systematically reduce emissions
  - ➢ Impact on average exposures
  - ➢ Impact on exposure distributions

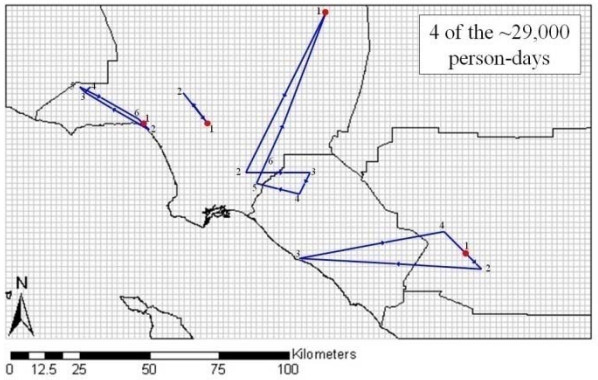


Exposure Model

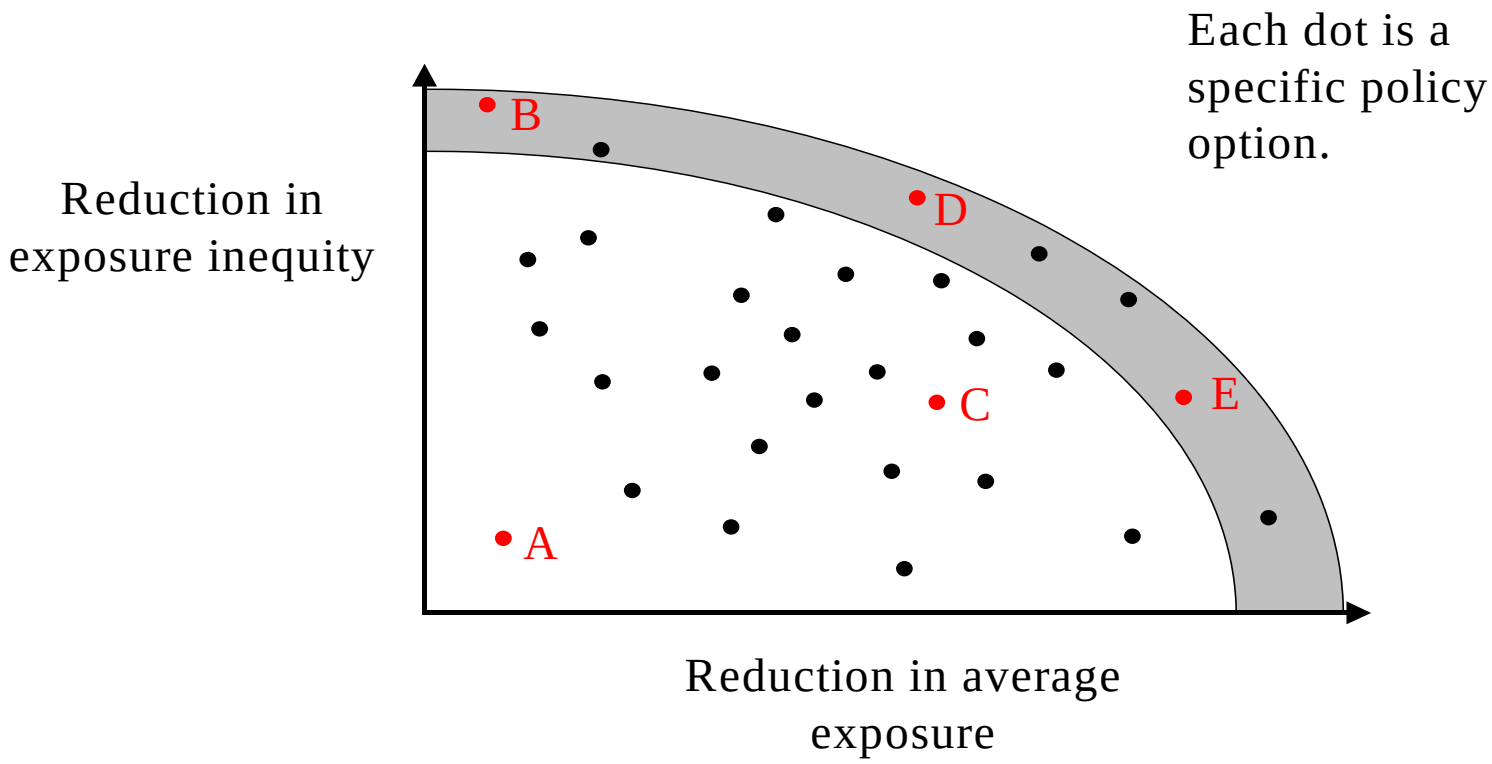
1. Ambient concentrations (CAMx model)
   - 6 air toxics
   - One year
2. Time-location-activity survey
   - ~ 29,000 person-days
   - "Geo-coded" locations
3. Breathing rates
   - Age, gender, activity level (Layton 1993)
4. Microenvironments
   - Indoors, outdoors, in-vehicle
   - Monte Carlo



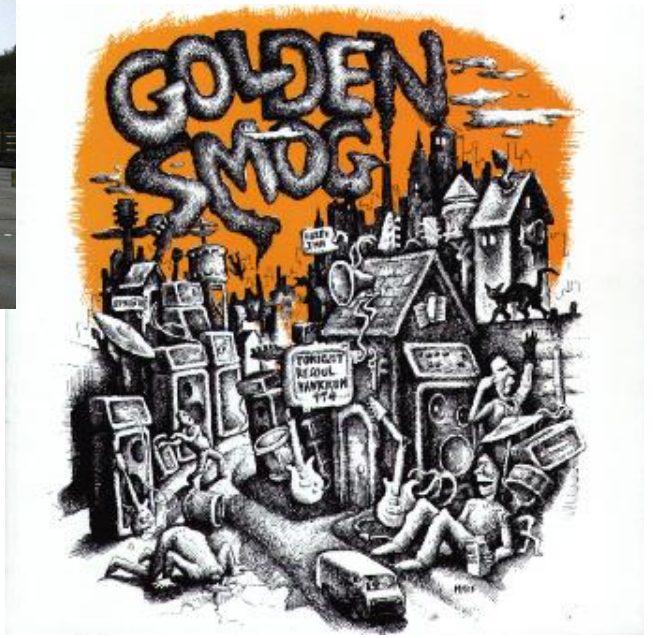


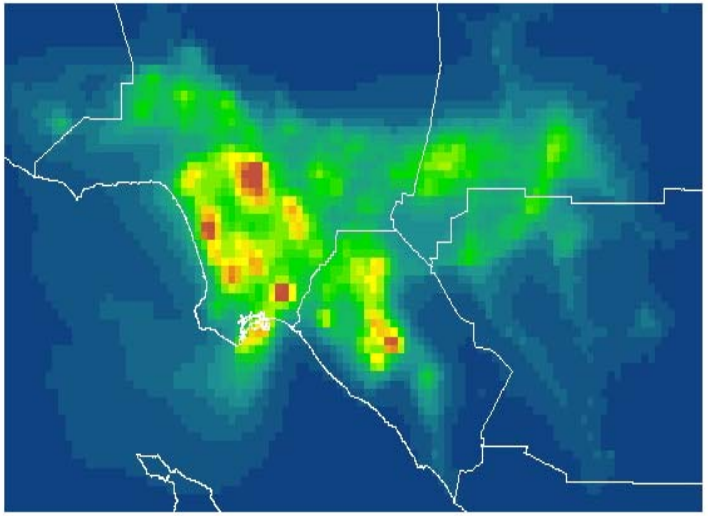


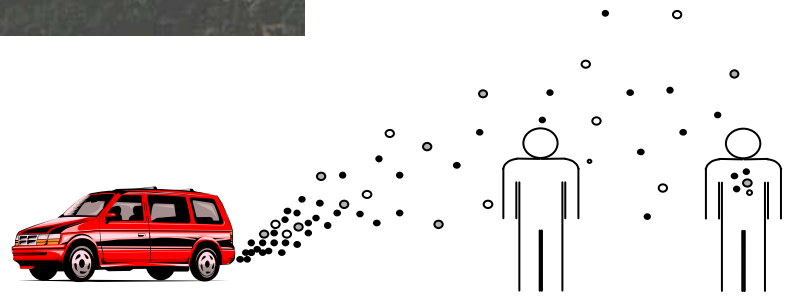
Hypothetical Results



Thank you.

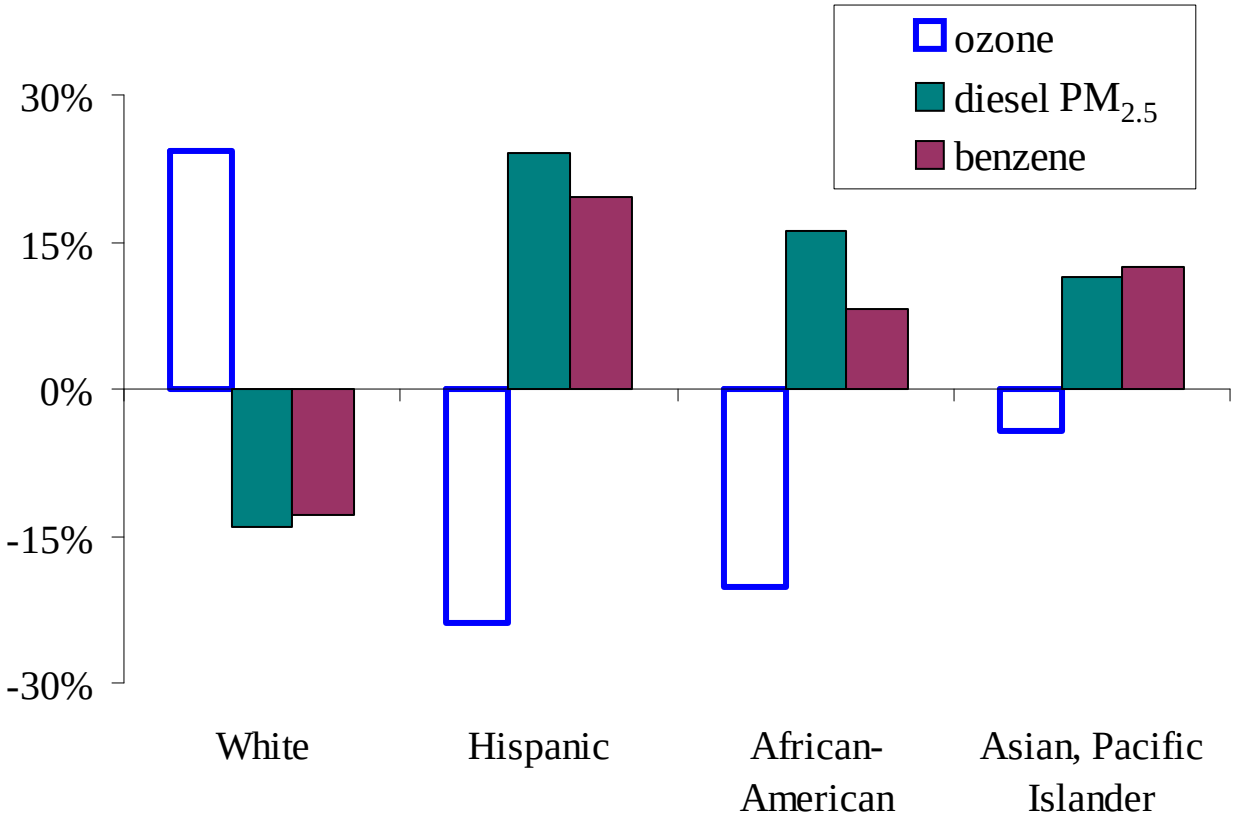




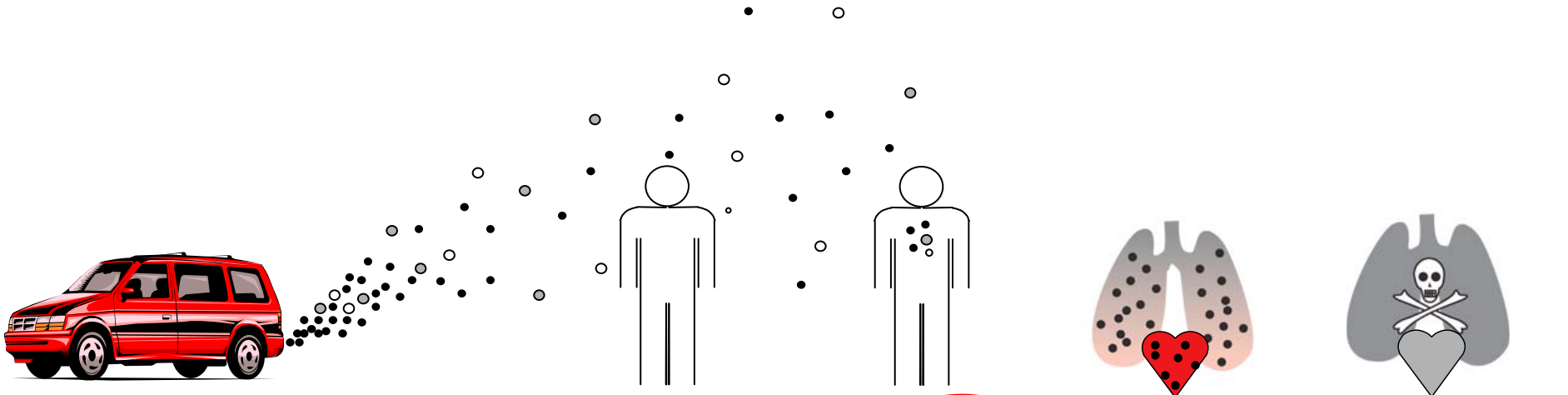


Intakes and ethnicity

Median intake, relative to population median



Air-pollution health-effects paradigm



emissions → concentration → exposure → intake → dose → health effects

Air-Quality Engineering

Environmental Health Sciences