

# *Environmental Progress Reconsidered*

Comments responding to *Air Quality in America*  
by Joel Schwartz and Steven Hayward

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## The Quote:

“Public and elite perception of air pollution levels, trends, and health risks, ... is virtually the opposite of reality...”

## The Question:

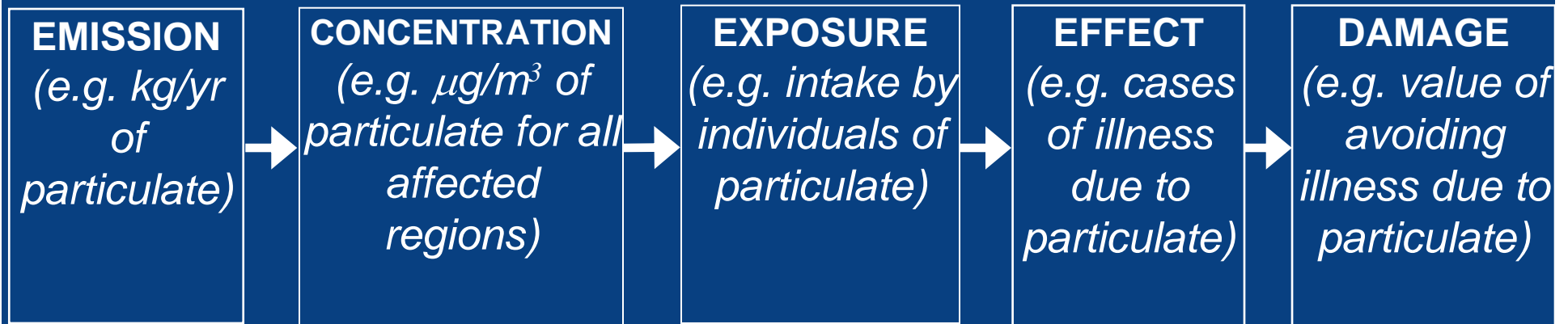
*Should policy makers be more concerned today than they were in 1970, 1979 or 1990?*

## My view:

Arguably, based on accepted science and economics, policy makers should have as great a sense of urgency today about reducing air pollution as they ever have previously.

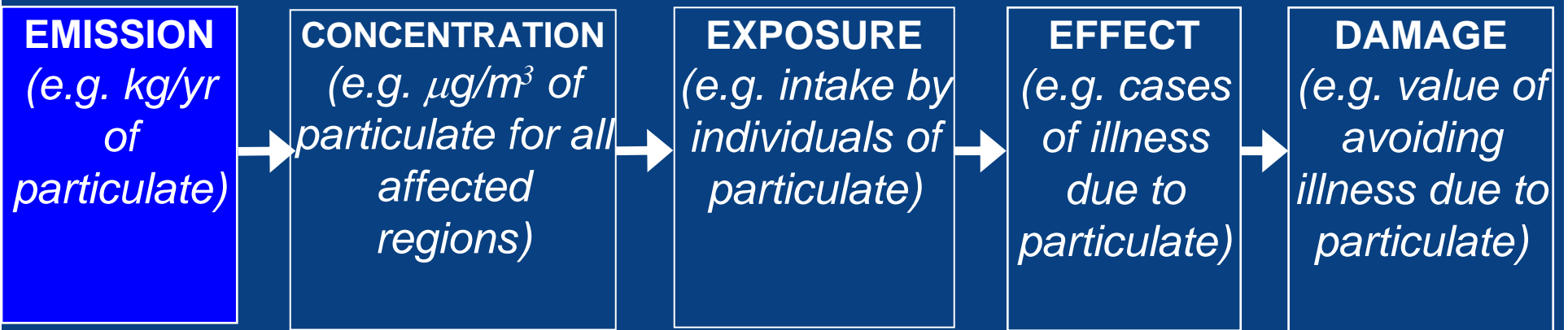
# The Economic Approach to Air Policy Valuation

## Damage Function Approach to Benefit-Cost Analysis



For policy analysis only (small) changes are meaningful.

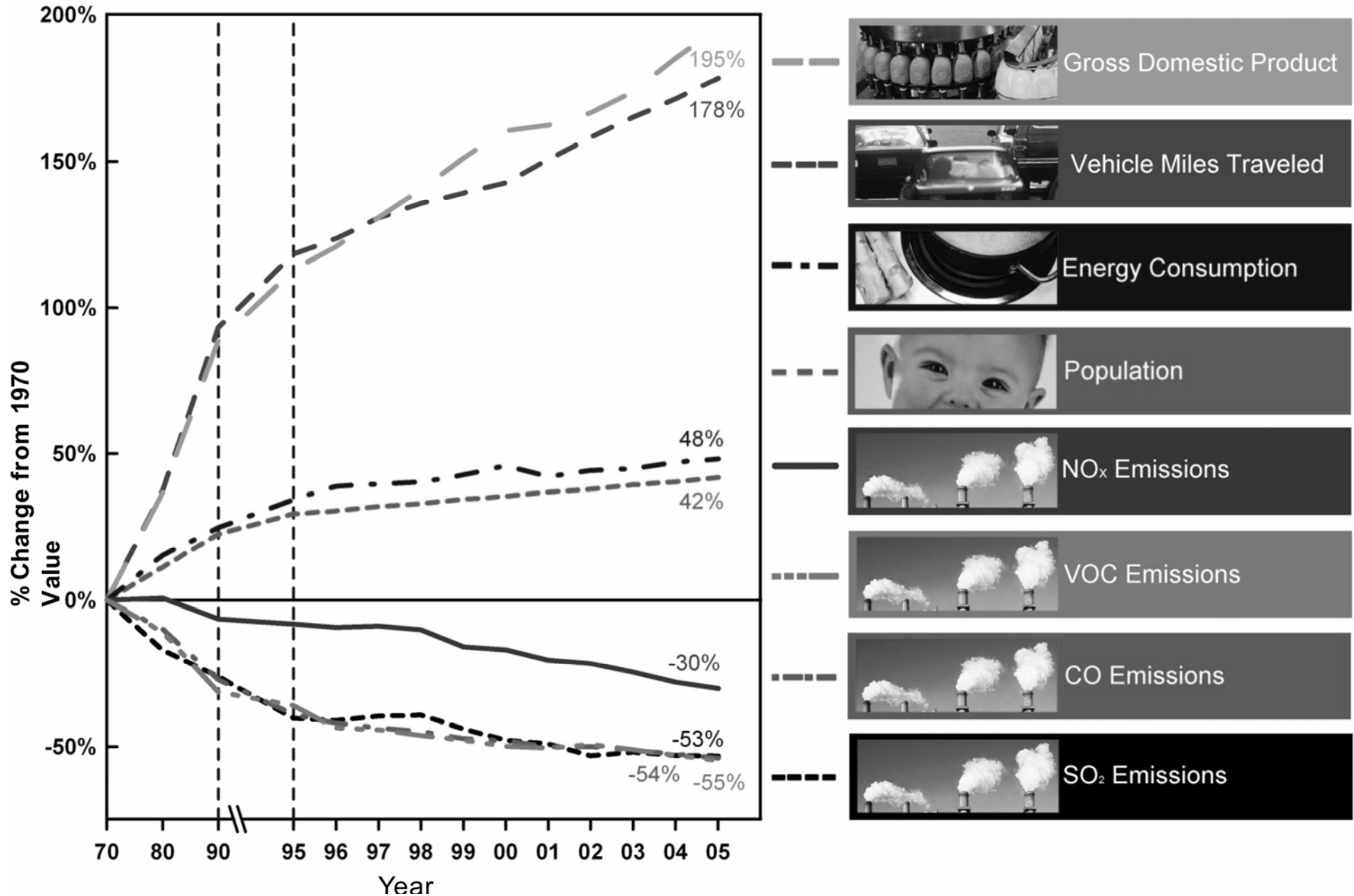
# Trends in Emissions: Steady Decline



Appreciable, continuing decline in most pollutants

# Measures of (mostly) Progress (Bachmann 2007)

## Comparison of Growth Areas and Emissions



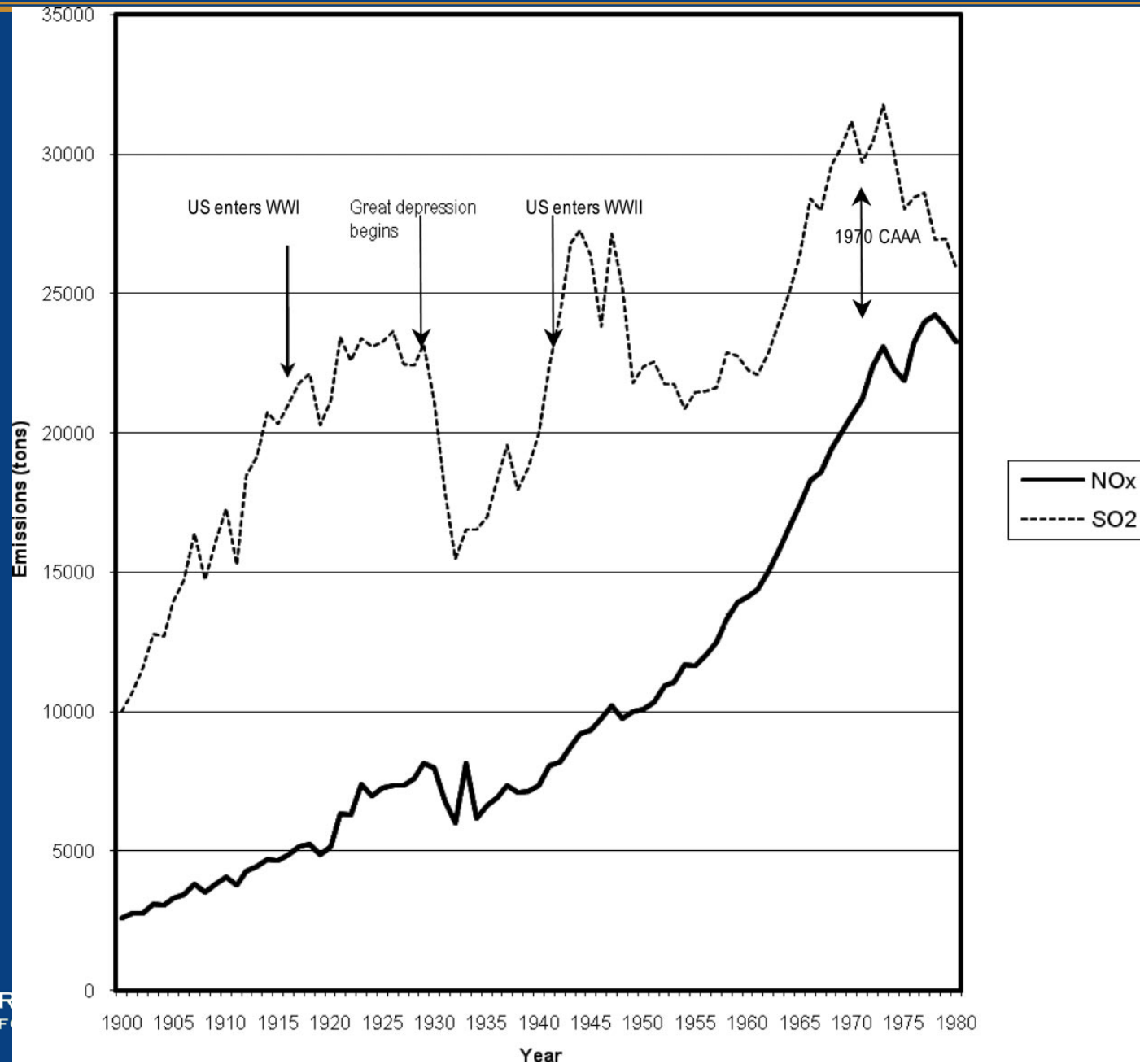
## What/Who Gets the Credit? Role of Federal Government

“Federal regulation has been responsible for most air quality improvement since 1970 not because it was necessary, but because the federal government seized control of air pollution policy from states, cities, common-law courts, and market actors who were addressing air pollution for decades before the federal government got involved.”

(Schwartz and Hayward p.5)

- **Not uncommon to rationalize policy at federal level – e.g. state antitrust, OSHA.**
- **Moreover, the assertion doesn't stand up to the evidence.**
- **What is the implied recommendation for climate policy?**

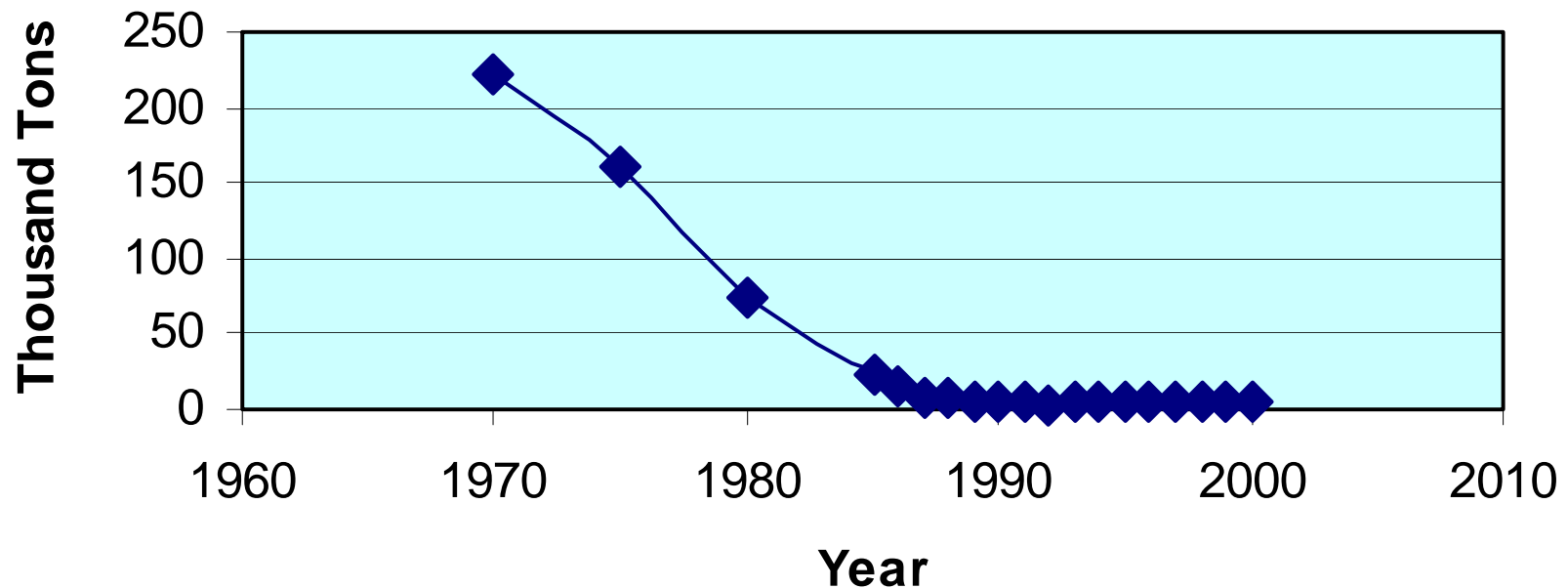
# Longer-Term Trends Pre-1970 CAAA (Bachmann 2007)



R  
F

# Government Played the Major Role in Lead Phase Out

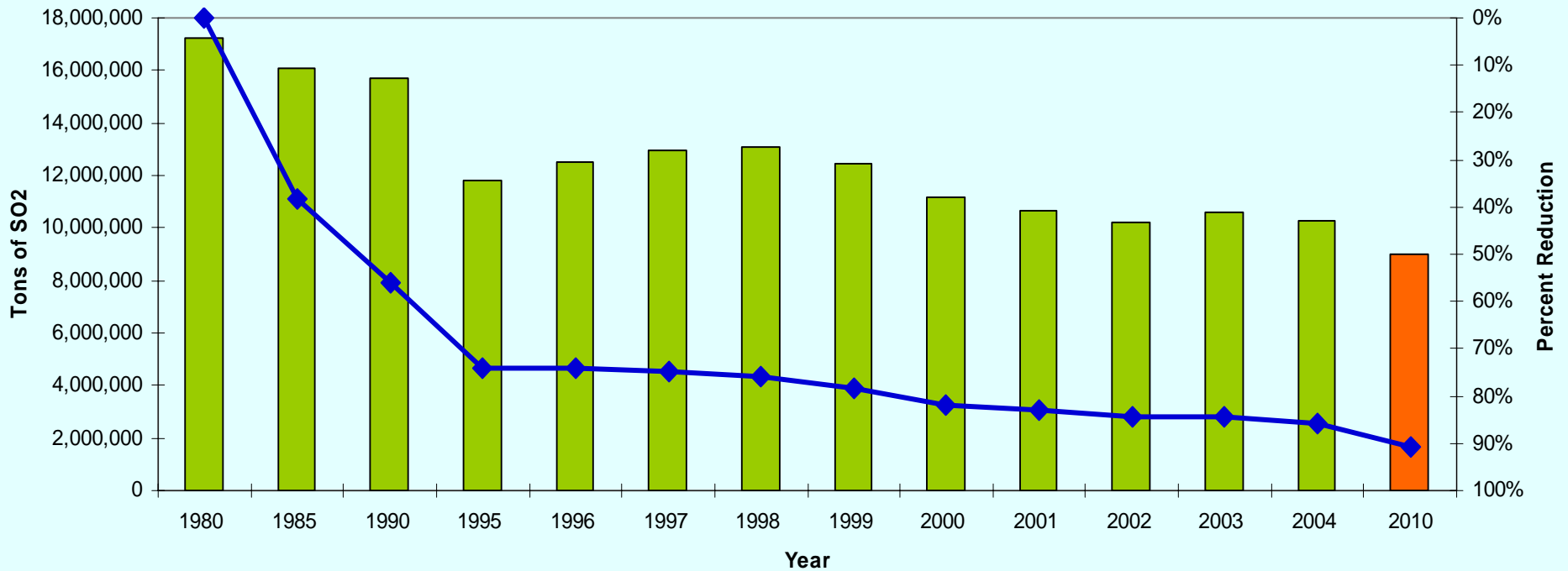
## Estimated National Emissions of Lead from All Sources (1970 - 2000)



# Title IV Ignites and Capitalizes on Advantageous Trends in Fuel Markets

## SO<sub>2</sub> Emissions v. SO<sub>2</sub> Emissions/GDP Intensity

Marginal Cost: ↓ 50-75% below forecasts  
Total Cost: ↓ 30-40% below forecasts

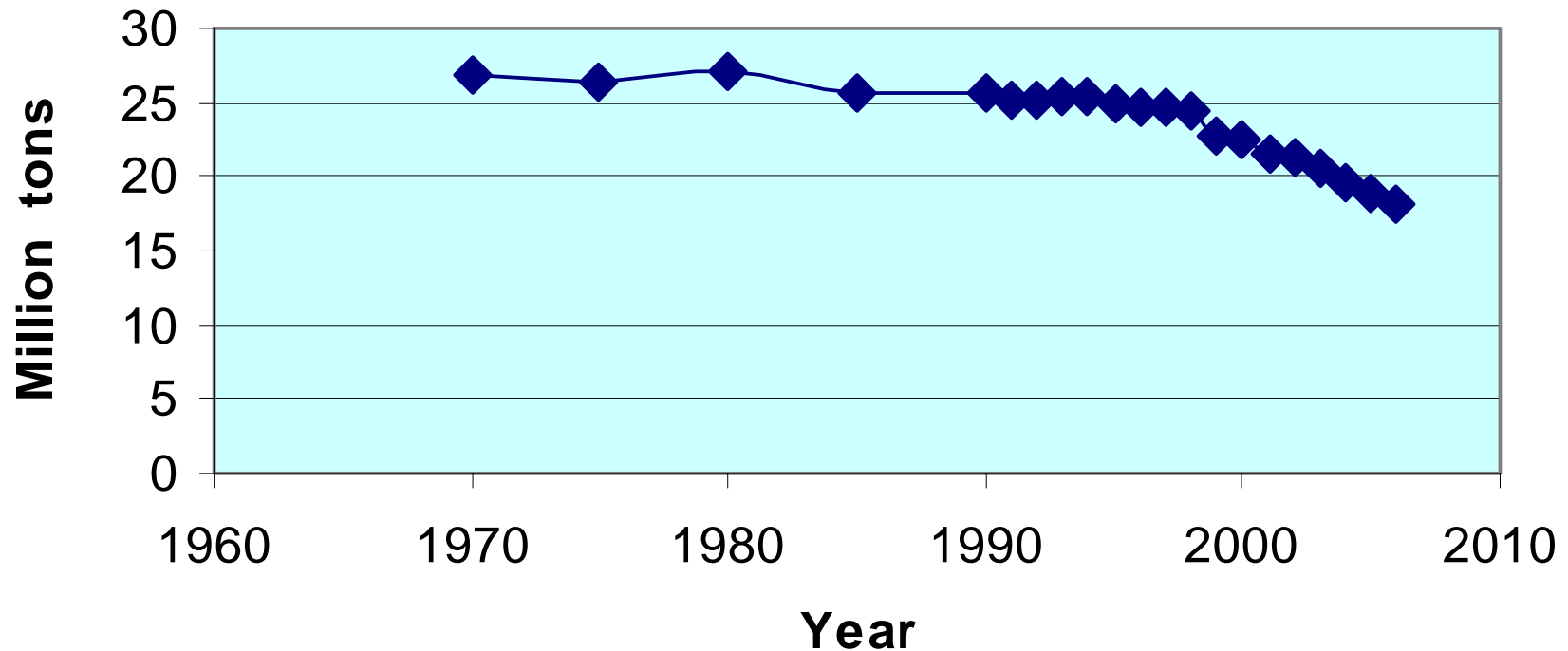


Source: EPA

SO2 Tons      Ton SO2/ \$ Billion Nominal GDP Intensity Reduction

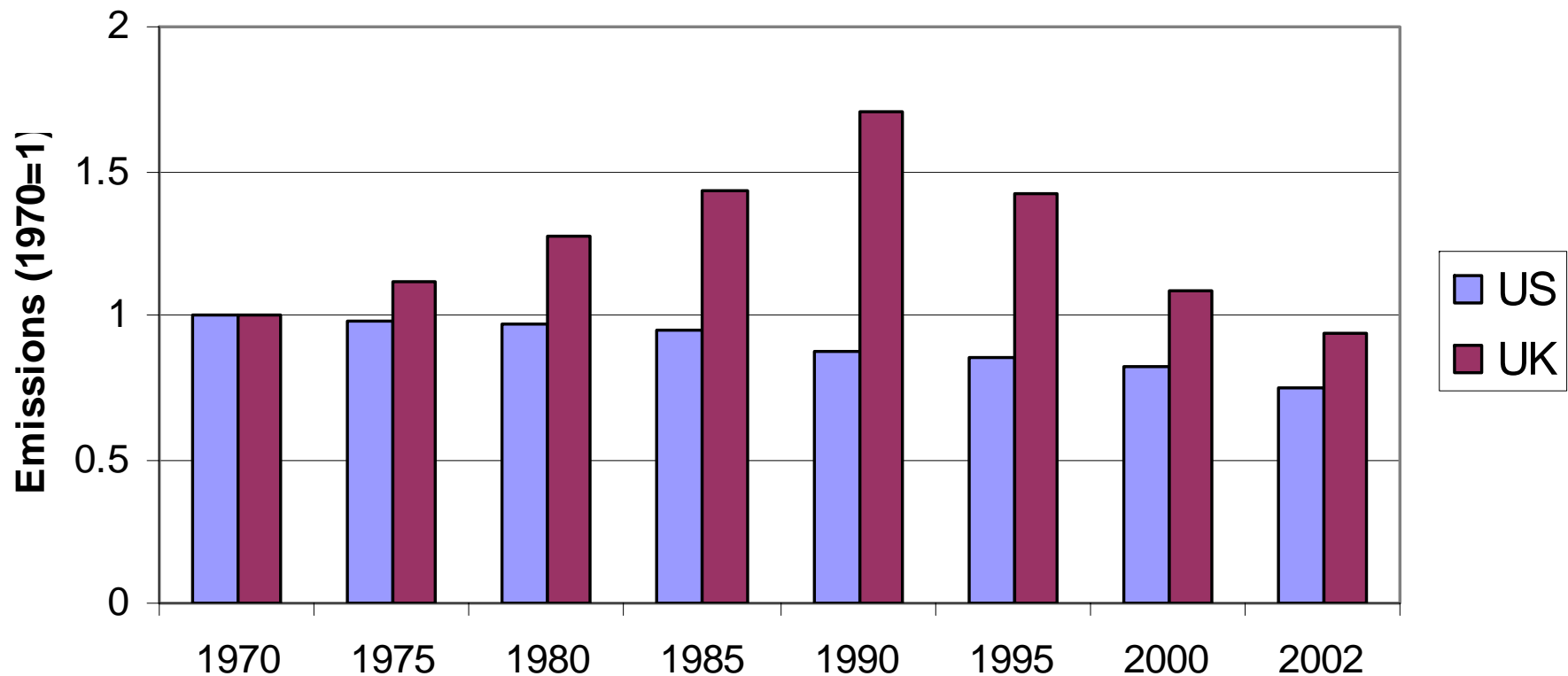
# NOx Emissions Finally Stabilize in the 1970s

## Estimated National Emissions of Nitrogen Oxides from All Sources (1970-2006)

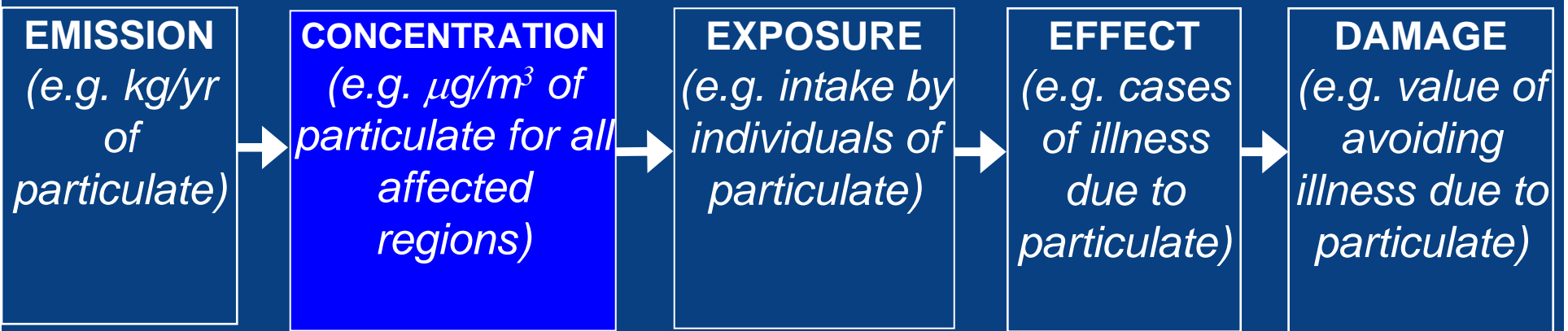


# But absent government action the US would likely have followed the European time path

## Total NOx emissions: US vs. UK

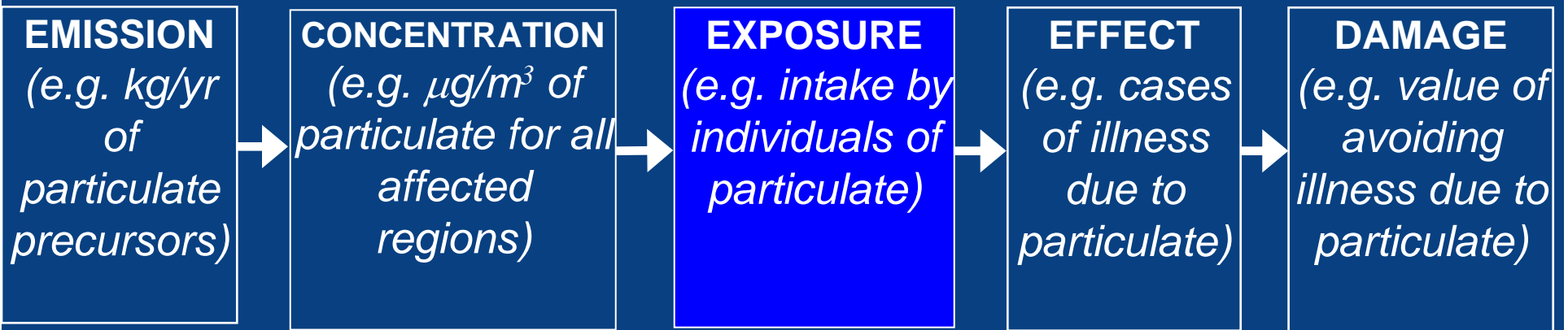


# Concentration: More information about specific effect pathways



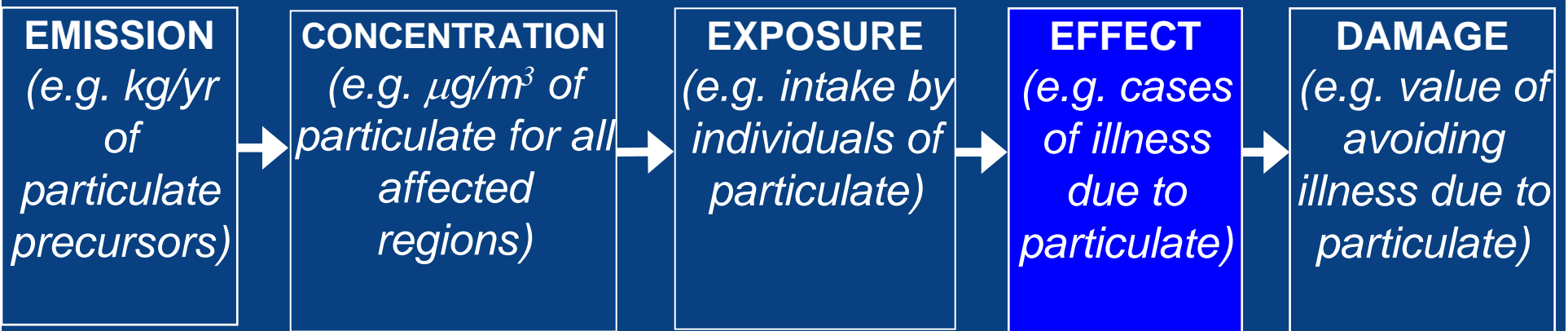
- **Spatial heterogeneity, speciation**
- **Temperature change (ozone)**
- **Are we regulating the wrong thing?**  
(Maybe, but nothing yet has been exonerated)
- **Improved monitoring should be a priority**

# Exposure: Potential slight downward trend



- **Air conditioning**
- **Covariance of pollutants**

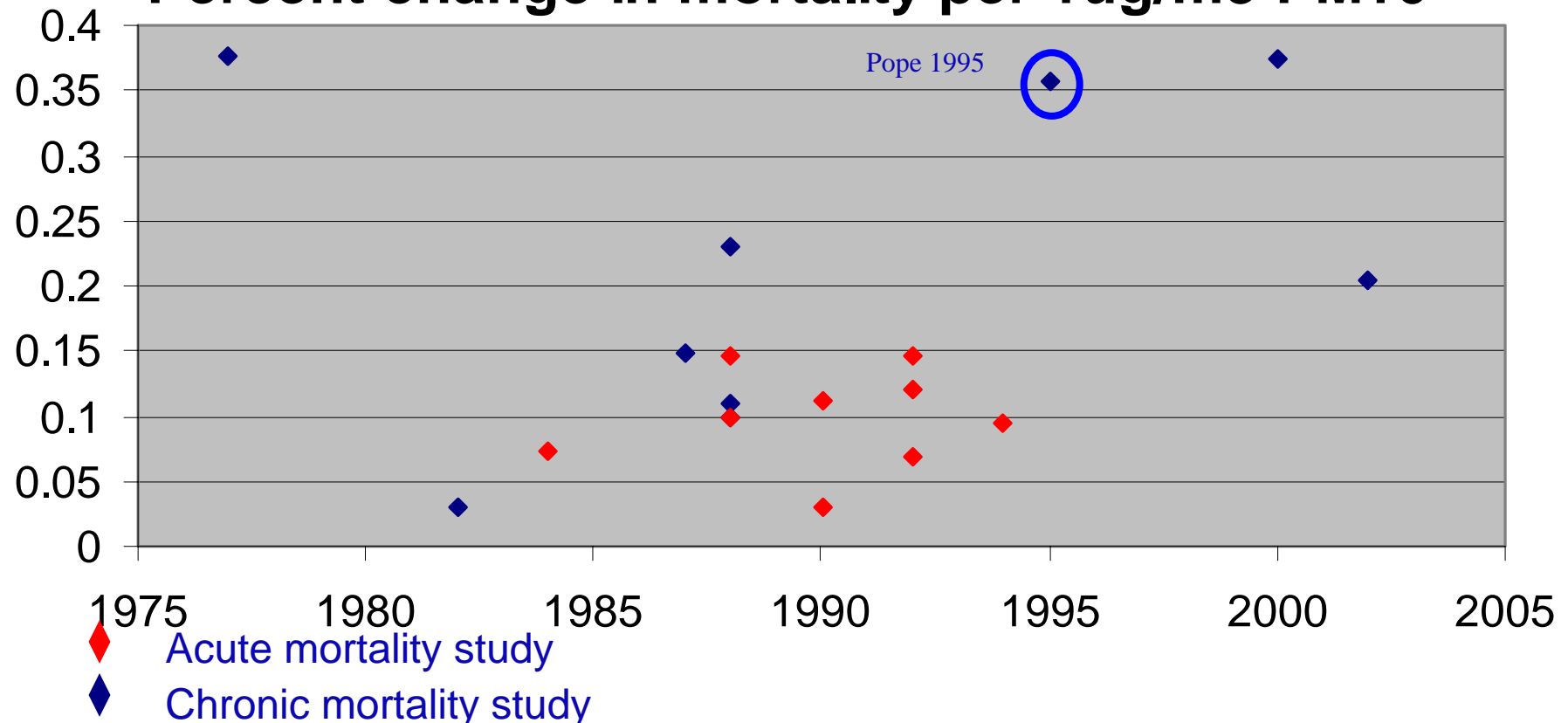
# Effects: Steadily Growing Literature, Refinement of Methods



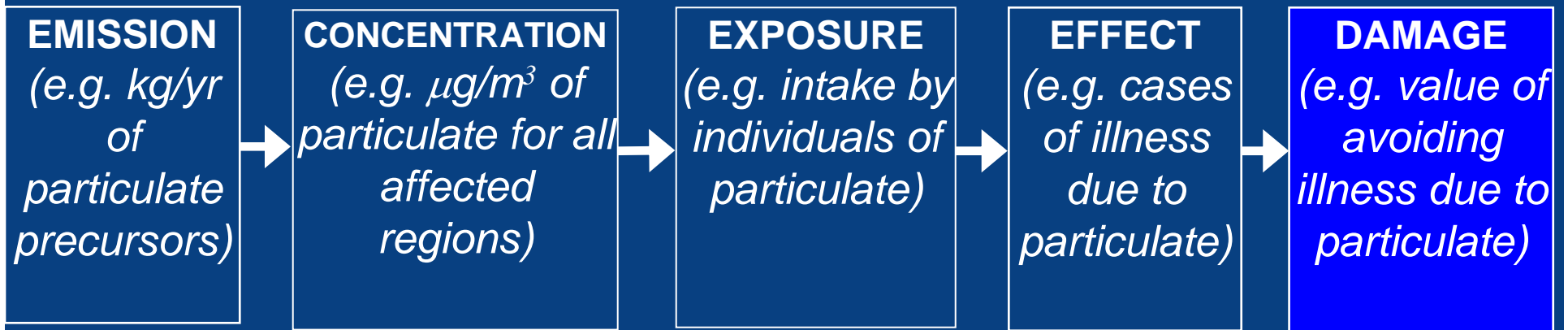
- **Prospective cohort studies**
- **Ozone mortality**
- **New time series studies identify effects pathways new endpoints, rule out displacement**
- **New studies identify subpopulations**

# Sampling of Important Epidemiology Studies: Long-Term Studies in the 90s Tripled Mortality Effect Estimates

## Percent change in mortality per 1ug/m<sup>3</sup> PM10



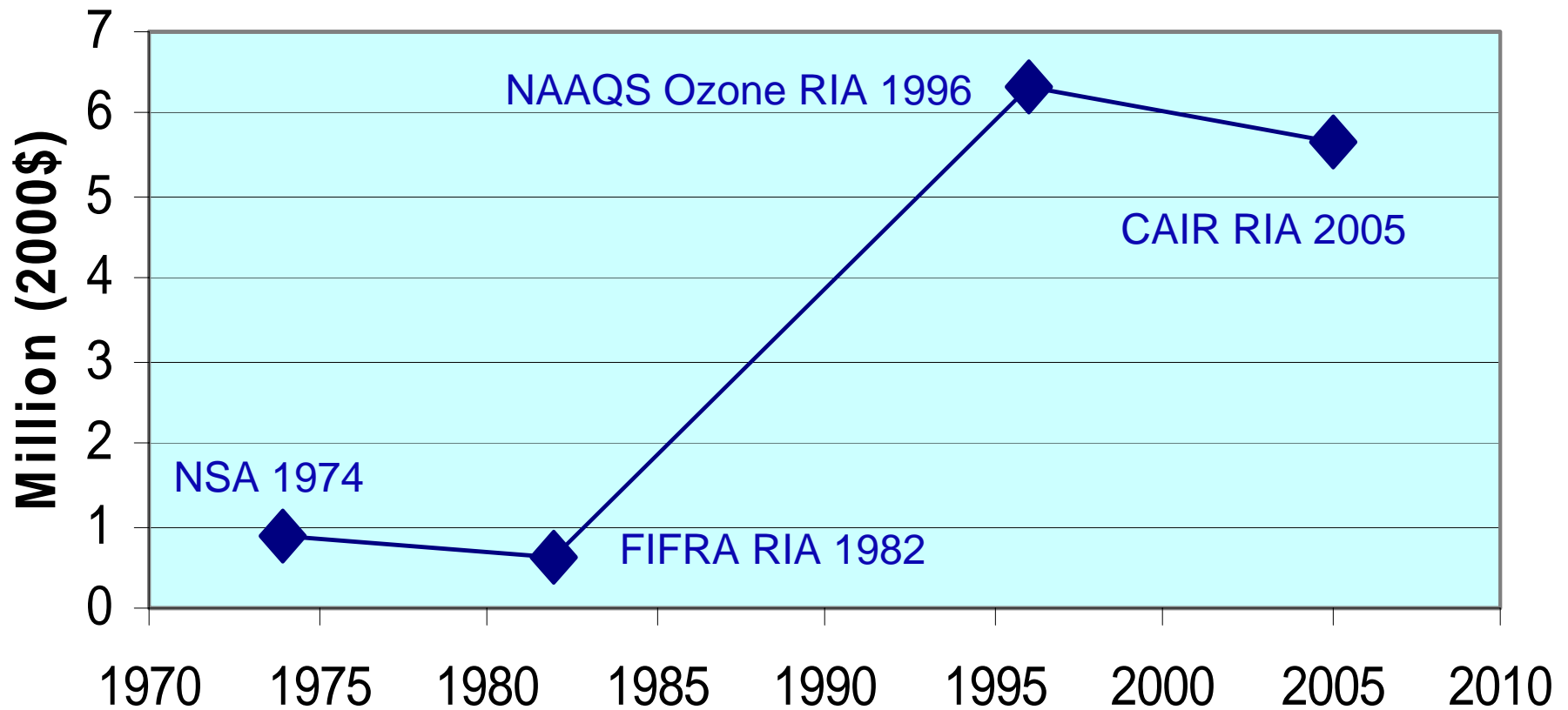
# Damage: Social Willingness to Pay Rising Steadily



- **Stated preference studies**
- **No senior discount**
- **Population (+50% since 1970)**
- **Income (+25% since 1970)**
- **Environmental justice paradigm - subpopulations**

# VoSL Methods Continue to Evolve

## VoSL Trend from 1970 to 2005



Cost of  
Illness

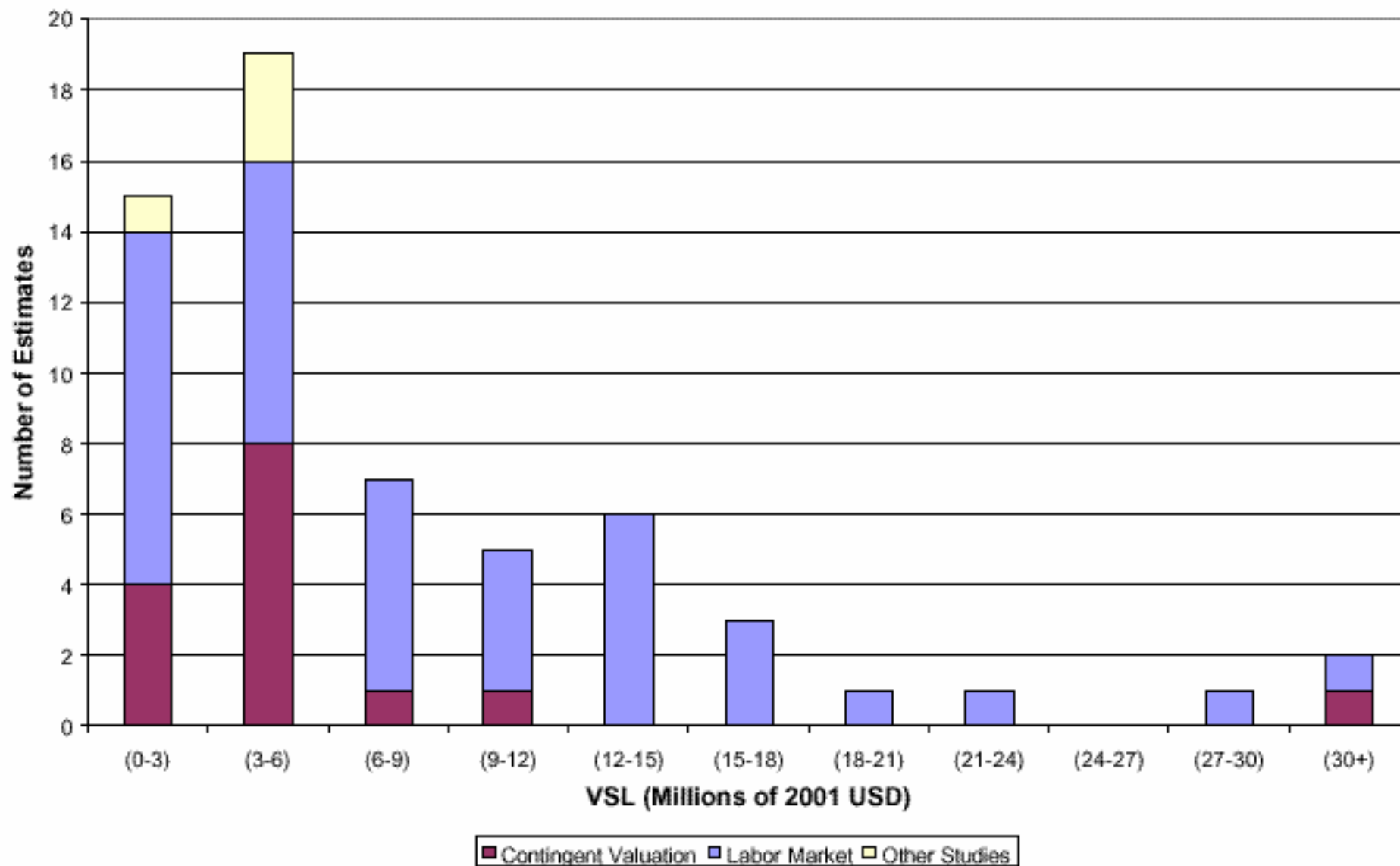


Compensating  
Wage

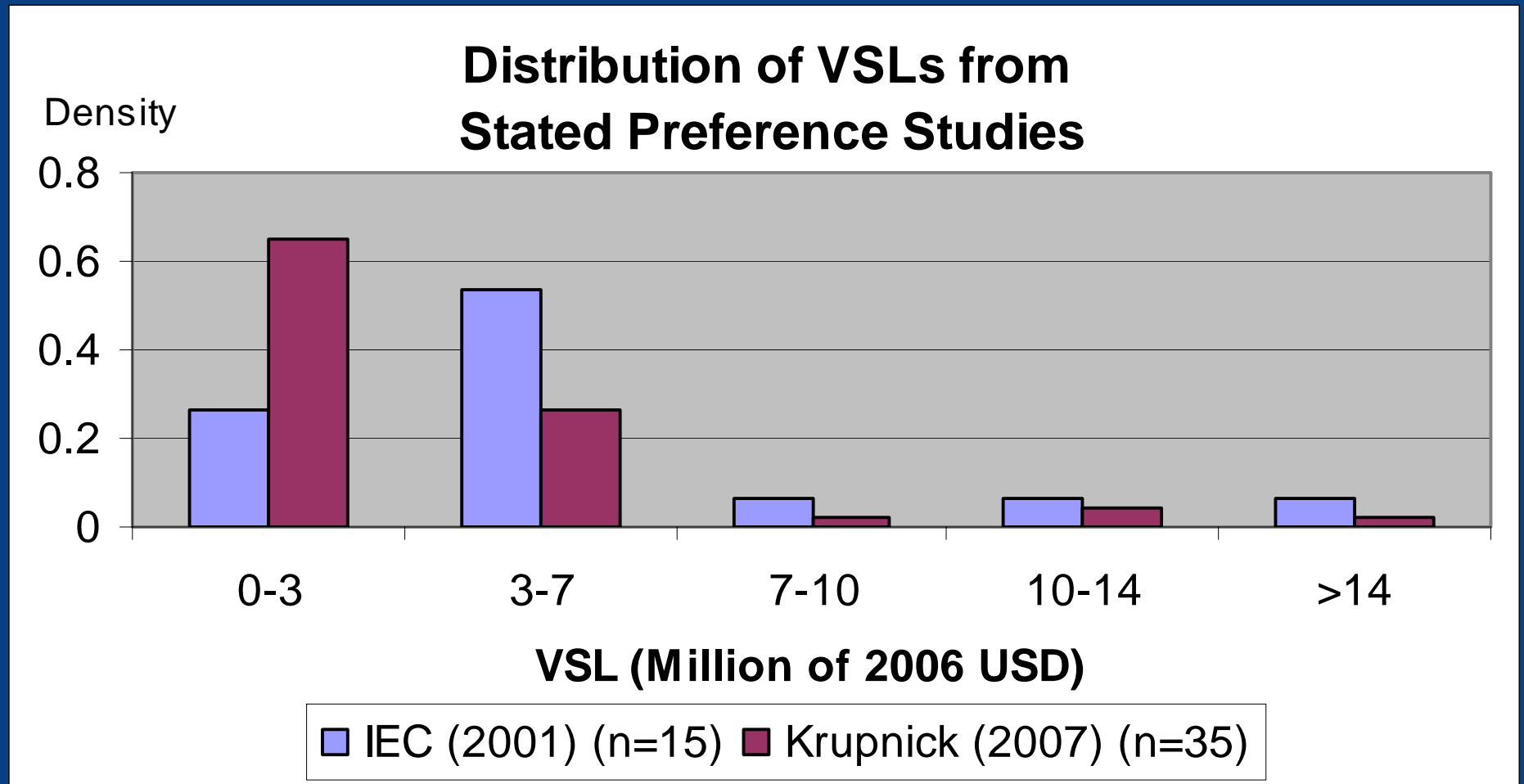


More Stated  
Preference?

# Distribution of estimates in 2000 by study type (n=60); Stated preference studies better match valuation construct

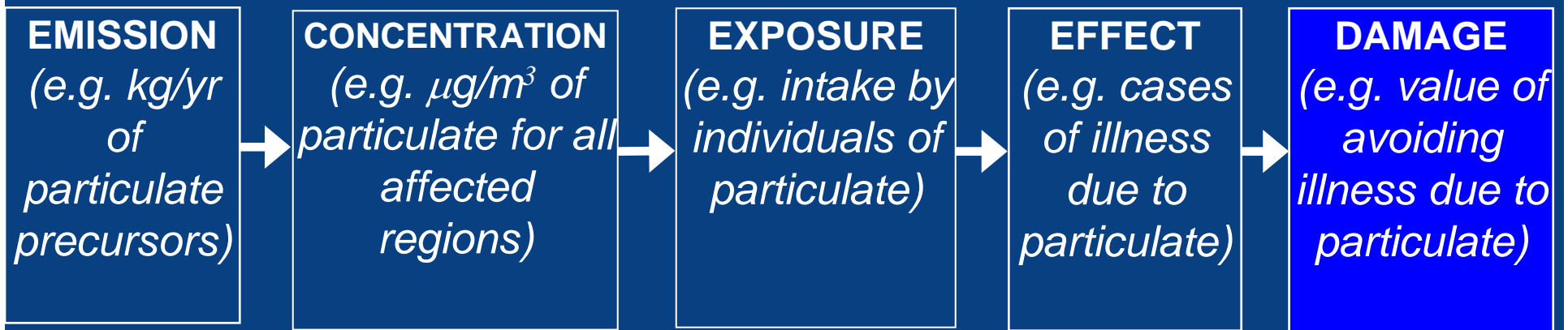


# Stated Preference Studies Show Downward Trend Since 2000; Meanwhile, Age Adjustment is *Not* Generally Justified



# What Did We Know and When Did We Know It?

Since Previous Clean Air Act Amendments...



Marginal and total net benefits from pollution control may be greater than recognized previously by science, economics, policy makers or the public.



## Some Reforms to Capture Greatest Net Benefits

1. Benefit cost measures suggest tighter and faster regulations for precursors of fine particles, less emphasis on ozone.
2. Better resolution in speciation monitoring will increase likelihood of better source apportionment.
3. Additional research on outdoor ambient concentrations and personal exposure.
4. Move away from stove-pipe regulation of pollutants.
5. Anticipate further identification of susceptible subpopulations, pollutant interactions.
6. Incentive-based approaches could be expected to reduce costs of a given goal, affording greater overall reductions.

*“From a purely scientific viewpoint, much is yet to be learned in the earth and life sciences...”*

-John Krutilla, Conservation Reconsidered, 1967.

## Conclusion:

Arguably, based on accepted science and economics, policy makers should have as great a sense of urgency today about reducing air pollution as they ever have previously.