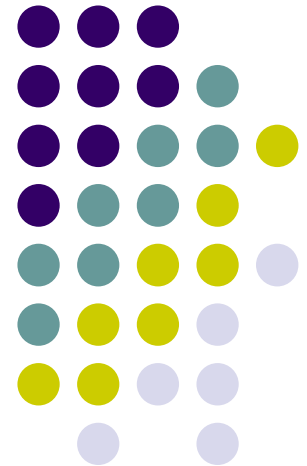


What Should Benefit-Cost Analysis Tell Us?

Maureen L. Cropper
RFF and University of Maryland

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What Does Benefit-Cost Analysis Tell Us?



- What people *think* would make them better off (“Positive”—or descriptive—approach)
- What *would* make people better off; What they *should prefer* (“Normative” Approach)
- To what use should BCA be put?
 - Should it inform decision makers?
 - Dictate regulatory outcomes?
 - Inform the public?

What Should Benefit-Cost Analysis Tell Us?



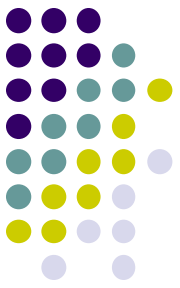
- It should identify efficient (and inefficient) policies, *assuming people are well informed about objectively measured risks.*
- It should not be the sole criterion for making a regulatory decision; equity and distributive considerations matter
- It should help us identify when we need to make equity-efficiency trade-offs

Implications for Conducting BCAs of Health & Safety Regulations



- BCAs should be conducted using the damage function approach:
 - Risk assessment should be separated from valuation and appropriate endpoints valued
- Valuation methods should demonstrate that people understand what they are valuing
- The distribution of benefits across members of society should be clearly documented
 - But not necessarily valued in dollar terms

Benefit-Cost Analysis via the Damage Function Approach



- Impacts of regulations on health endpoints estimated (objectively) by risk assessors
- Unit values applied to health endpoints (premature mortality, cancer cases avoided)
 - Economists attempt to measure what people would pay for changes in health risks
 - Lower-bound estimates (cost of illness; earnings losses) sometimes used
- Approach is “normative” in JKH’s terminology
 - We are measuring benefits associated with objectively measured risks – not people’s risk perceptions
 - Not normative in the sense that this determines the regulatory outcome

The Damage Function Approach – Case of Air Toxics



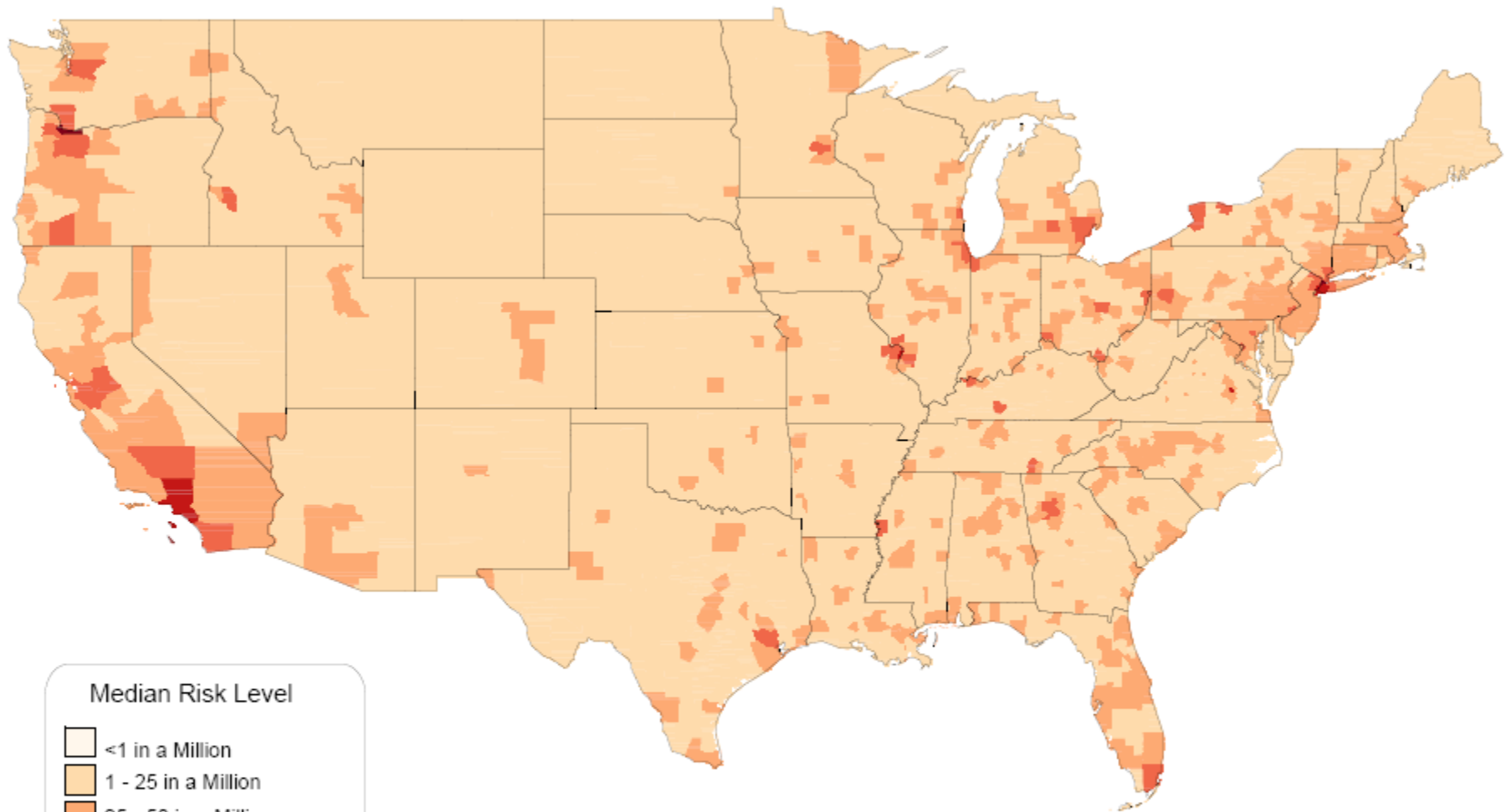
- The National Scale Air Toxics Assessment (NATA) database
 - Estimates the impact of emissions of 177 toxic air pollutants on ambient air pollution levels
 - Calculates effects on population exposures at census block group level
 - Estimates lifetime cancer risk for 87 HAPS
 - Damage function approach would value changes in cancer risks using stated or revealed preference studies

Important Facts About Hazardous Air Pollutants (HAPS)

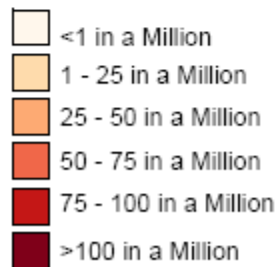


- Lifetime cancer risks are generally small:
 - 95th percentile of lifetime cancer risk (measured at Census tract level) is $\approx 2 \times 10^{-4}$
- Distribution of cancer risks is uneven:
 - Map on next page shows lifetime cancer risk at the county level based on 1999 NATA database
 - Concern that low-income groups, minorities are more highly exposed to HAPS

1999 National Scale Assessment Estimated County Level Carcinogenic Risk



Median Risk Level



What Can BCA Tell Us About Regulations to Control HAPS?



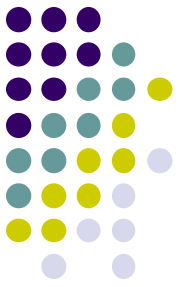
- Combine objectively measured risk reductions with studies that value cancer risks
- Good studies capture the dreadedness of the disease, side-effects of treatment and morbidity that precedes death
- Suggests a preference for stated preference studies
- Could use revealed preference studies where it is clear that cancer endpoint is valued (e.g., Davis AER (2004))
- What is BCA alternative to this approach?
 - Could use impact of emissions reductions on property values

Benefits of Benzene Reductions in Houston



- Section 812 Benzene case study (IEC, 2008) an excellent example of a careful study
 - Examines benefits of reducing benzene exposure from all applicable titles of the 1990 CAAA
 - Does not examine costs
- Predicted reduction in leukemia cases:
 - 7 fatal and 6 non-fatal cases over 1990-2020 period
- NPV of cancer benefits from benzene reductions in Houston, 1990-2020 \approx \$30 Million (2006 USD)
- Suggests a situation where may have to trade equity for efficiency

How to Deal with Equity Issues?



- Could elicit willingness to pay to reduce cancer risks to others
 - Assuming people are paternalistic altruists, may want to allow these values in a BCA
- BCA can be supplemented by information on the distribution of risks across the population (e.g., using an Atkinson Index)
- Should be careful what is monetized in a BCA
 - Don't ask people to value a scale-independent equity measure

Conclusions



- What a BCA Should Do:
 - It should identify efficient (and inefficient) policies, *assuming people are well informed about objectively measured risks.*
 - It should supplement aggregate benefits and costs with measures of their distribution in the population
- What a BCA Should Not Do:
 - Use revealed preference studies unless it can be demonstrated that people accurately perceived associated health effects
 - Monetize equity measures—although equity considerations should be considered in decision making