Synthesizing Research for Benefit Transfer: Valuing Mortality Risk Reductions

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Methods for Research Synthesis:
A Cross-Disciplinary Workshop

Harvard Center for Risk Analysis

October 3, 2013

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  - Evaluation criteria
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Context

- The goal:
  - Estimate whether the benefits of a policy exceed its costs.
- The question:
  - How to synthesize research to value benefits when studies of similar, but not identical, outcomes are available.
- The example:
  - The value individuals place on small reductions in their own mortality risks (the value per statistical life or VSL).

Context

- Three options:
  - Conduct new primary research
    - Lack time, money; need to make a decision.
  - Exclude the outcome from the analysis
    - Difficult to determine whether subjective judgments are within a reasonable range.
  - Apply the available research, using the “benefit transfer” framework.
    - Evaluate for suitability and quality.
    - Assess implications of uncertainty.

The Benefit Transfer Framework

(1) Describe the Policy Scenario

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(2) Identify Potentially Relevant Existing Valuation Research

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(3) Review Existing Studies for Quality and Applicability

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(4) Transfer the Estimate(s)

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(5) Address Uncertainty

The Benefit Transfer Framework

- VSL = an individual's willingness to pay (WTP) for a small annual change in his/her own risk, divided by risk change.
  - If $900 = individual WTP for a 1/10,000 annual mortality risk change,
  - then VSL = $9 million ($900 ÷ 1/10,000).
- Not the value of saving an individual's life with certainty.

The Benefit Transfer Framework

- Types of data
  - **Revealed preference** methods use market transactions or observed behavior to estimate the value of related goods;
    - e.g., changes in wages associated with changes in job-related risks, controlling for other influencing factors.
  - **Stated preference** methods ask respondents to report their WTP under hypothetical scenarios.

Current Practices

- Federal agencies currently use point estimates from selected studies; most address job-related risks.
  - EPA VSL based on 26 values from 1992/1993 literature review.
    - Substantial work on alternatives, expert panel guidance.
  - DOT VSL based on 9 values from 2013 literature review.
- In 2012 dollars:
  - EPA's estimate is $9.2 million;
  - DOT's estimate is $9.1 million.

Current Practices

- Why not other methods?
  - Available **meta-analyses** criticized for study selection criteria and statistical methods.
    - Evolving best practice standards for primary research.
  - **Structural models**, that combine theory and data from multiple sources, are in need of further refinement.
  - One **expert elicitation**, has not yet gone beyond the pilot stage.

Criteria for Applicability of Synthesis Methods

- Validity:
  - Difficult to determine.
    - Compare to well-conducted primary research study.
  - Likely to vary across applications.
- Depends on:
  - The quality of the primary research.
  - The similarity of the study and policy outcomes.
  - The extent to which the study results can be adjusted to fit the policy outcome.

Criteria for Applicability of Synthesis Methods

- How does uncertainty in the benefits estimates affect:
  - The estimates of expected net benefits for individual policy options?
  - The estimate of which option is likely to lead to the largest net benefits?
- In some cases, effect may be minimal; it may be substantial in others.

Suitability of Synthesis Methods

- Use of individual studies or meta-analysis appropriate when:
  - study and policy scenario are similar,
  - primary research includes variables that can be used to adjust results;
    - e.g., meta-regression to estimate effect of age, disease severity, on values.

Suitability of Synthesis Methods

- Use of structural models appropriate when:
  - Theoretical relationships are relatively unambiguous.
  - Data are available for estimation.
  - Few cases may fall into this category.
- Use of expert elicitation useful when:
  - Some research available, inconsistent results.
  - Many cases may fall into this category.

Strengths and Limitations of Outputs

- Regardless of method, need clear and transparent discussion/assessment of:
  - quality of primary research;
  - effect of scenario differences.
- Also quantitative uncertainty analysis:
  - Breakeven;
  - Sensitivity;
  - Probabilistic.

Research Needs

- More “best practices” primary research studies.
- Continued work on best practice standards.
- Consistent reporting standards for primary research studies.
- New, improved meta-analyses.
- More work on structural modeling and expert elicitation.