Synthesizing Research for Benefit Transfer: Valuing Mortality Risk Reductions

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> Methods for Research Synthesis: A Cross-Disciplinary Workshop

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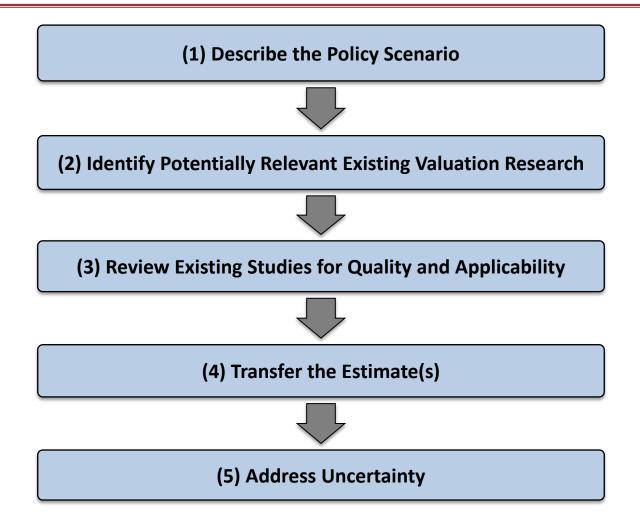
Context

- 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



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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 jobrelated 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.