

non-market values from the context of study to a new context.

Although benefit transfer offers a quick, low cost approach for establishing values for goods and attributes of goods, you should consider it as a last resort option. Several studies have documented difficulties in applying benefit transfer methods. If a benefit transfer approach is necessary, you should adopt the approach of transferring the entire demand function (referred to as benefit function transfer) rather than adopting a single point estimate (referred to as benefit point transfer). The former approach has been shown to yield more precise estimates than the latter approach.

In conducting benefit transfer, the first step is to specify the value to be estimated at the policy site. The analyst should identify the relevant measure of the policy change at this initial stage. For instance, you can derive the relevant willingness-to-pay measure by specifying an indirect utility function. This identification allows an analyst to "zero in" on key aspects of the benefit transfer.

The next step is to identify appropriate studies to conduct benefit transfer. In selecting transfer studies for either point transfers or function transfers, you should base your choices on the following criteria:

- a. The selected studies should be based on adequate data, sound empirical methods and defensible empirical techniques.
- b. The selected studies should document parameter estimates of the valuation function.
- c. The study context and policy context should have similar populations (e.g., demographic characteristics, target population size).
- d. The good, and the magnitude of change in that good, should be similar in the study and policy contexts.
- e. The relevant characteristics of the study and the policy contexts should be similar. For example, are they similar in the following respects?
 - The reversibility of the policy change
 - The degree of embedding of other values
 - The order in which the good is supplied
 - The functional relationship between the consumer surplus and its determinants.
- f. The distribution of property rights should be similar so that the analysis uses the same welfare measure. If the property rights in the study context support the use of willingness-to-accept (WTA) measures while the rights in the policy context support the use of willingness-to-pay (WTP) measures, benefit transfer is not appropriate.
- g. The availability of substitutes across study and policy contexts should be similar.

Clearly, all of these criteria are difficult to meet. However, you should attempt to satisfy as many as possible when choosing studies from the existing economic literature. In addition to the above criteria, an analyst should keep in mind some of the difficulties in transferring benefit estimates or functions from one context to another:

- Is the policy change irreversible?
- Does the order in which the good is supplied affect valuation?
- Is the embedding problem significant?
- Is the assumed functional relationship between the consumer surplus measure and its determinants explicit and appropriate?

Finally, you should not use benefit transfer in estimating benefits if:

- Resources are unique or have unique attributes.
- If the study examines a resource that is unique or has unique attributes, you should not transfer benefit estimates or functions to value a different resource and vice versa. For example, if a study values visibility improvements at the Grand Canyons, these results should not be used to value visibility improvements in urban areas.
- There are significant problems with applying an ex ante valuation estimate to an ex post policy context. If a policy yields a significant change in the attributes of the good, you should not use the study estimates to value the change using a benefit transfer approach.
- You also should not use a value developed from a study involving small marginal changes in a policy context involving large changes in the quantity of the good.

7. Methods for Treating Nonmonetized Benefits and Costs

Sound quantitative estimates of benefits and costs are preferable to qualitative descriptions of benefits and costs to help decision-makers understand the full effects of alternative actions. Although we prefer that agencies use acceptable monetized benefit and cost estimates, we recognize that monetizing some of the effects of regulations is difficult, and even quantifying some effects may not be feasible.

a. What To Do With Benefits and Costs That Are Difficult To Monetize?

You should monetize quantitative estimates whenever possible. Use sound and defensible values or procedures to monetize costs and benefits, and ensure that key analytical assumptions are defensible. If monetization is impossible, explain why and present all available quantitative information. For example, if you can quantify, but cannot monetize, improvements in water quality and increases in fish populations resulting from water quality regulation, you can describe benefits in terms of stream miles of improved water quality for boaters and increases in game fish populations for anglers. You should describe the timing and likelihood of such effects and avoid double-counting of benefits when estimates of monetized and physical effects are mixed in the same analysis. You should also apply the discounting procedures described above to all quantified effects, whether or not you are able to monetize them.

b. What To Do With Benefits and Costs That Are Difficult To Quantify?

If you are not even able to quantify the effects, you should present any relevant quantitative information along with a description of the unquantifiable effects. Such descriptions could include ecological gains, improvements in quality of life, and aesthetic beauty. For cases in which the presence of unquantifiable benefits or costs affects a policy choice, you should provide a clear explanation of the rationale behind the choice. Such an explanation could include detailed information on the nature,

timing, likelihood, location, and distribution of the unquantified benefits and costs. Also, please include a summary table that lists all the unquantifiable benefits and costs, ordered by expected magnitude, if possible.

8. Monetizing Health and Safety Benefits and Costs

We expect you to provide a benefit and cost analysis of major health and safety rulemakings in addition to a CEA. The BCA provides additional insight because (a) it provides some indication of what the public is willing to pay for improvements in health and safety and (b) it offers additional information on preferences for health using a different research design than is used in CEA. Since the health-preference methods used to support CEA and BCA have some different strengths and drawbacks, it is important that you provide decision makers with both perspectives.

In monetizing health benefits, a willingness-to-pay measure is the conceptually appropriate measure as compared to other alternatives (e.g., cost of illness or lifetime earnings), in part because it attempts to capture pain and suffering and other quality-of-life effects. Using the willingness-to-pay measure for health and safety allows you to directly compare your results to the other costs and benefits in your analysis, which will also typically be based on willingness to pay.

If well-conducted, revealed-preference studies of relevant health and safety risks are available, you should consider using them in developing your monetary estimates. If appropriate revealed-preference data are not available, you may consider whether valid and relevant data from stated-preference studies are available. You will need to use your professional judgement when you are faced with limited information on revealed preference and substantial information based on stated preference studies.

A key advantage of stated-preference and health-utility methods (compared to revealed preference) is that they can be tailored in their design to address ranges of probabilities, types of health risks and specific populations affected by your rule. In many rulemakings there will be no relevant information from revealed-preference studies. In this situation you should consider commissioning a stated-preference study or using values from published stated-preference studies. For the reasons discussed in the section above IVB5, you should be cautious about using values from stated-preference studies and describe in the analysis some of the inherent drawbacks of this approach.

a. Nonfatal Health and Safety Risks

With regard to nonfatal health and safety risks, there is enormous diversity in the nature and severity of impaired health states. A minor traumatic injury that can be treated effectively in the emergency room without hospitalization or long-term care is different from a traumatic injury resulting in paraplegia. Severity differences also are important in evaluation of chronic diseases. A severe bout of bronchitis, though perhaps less frequent, is far more painful and debilitating than the more frequent bouts of