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MORBIDITY VALUE TRANSFER

1. INTRODUCTION

In many environmental regulation contexts, an important category of impacts from regulation is impacts on public health. These can include impacts on both rates of mortality and rates of morbidity in the affected population. Indeed, for regulations aimed at improving air or water quality, health benefits can be the dominant category of impacts in a regulatory impact analysis. For example, in a prospective cost-benefit analysis of the 1990 Clean Air Act Amendments (US EPA 1999), decreases in mortality and morbidity from improved air quality constituted over 95% of the total estimated benefit.

When compared to valuation of other environmental goods such as outdoor recreation, scenic quality, wilderness, and wildlife populations, the approach typically used to value improvements in health resulting from improved environmental quality is somewhat unique, in that it relies heavily on unit values and value transfer.[1] The typical approach when valuing environmental health improvements from a proposed action is to follow the damage function approach, which is discussed in the first chapter of this volume. First, projected changes in exposure to pollutants are combined with established exposure-response relationships. This type of analysis gives predictions of how many ill health outcomes would be avoided as a result of the action.[2] These improvements in public health are then valued by multiplying the number of each type of ill health outcome avoided by a constant value specific to each outcome.[3]

The focus of this chapter is on the third step in this approach, multiplication of the number of ill health outcomes to be avoided by an outcome-specific unit value per incidence. Three categories of value are generally considered: (1) the social costs of providing medical treatment to the victim of the ill health outcome; (2) lost labor productivity resulting from the ill health outcome; and (3) the pain, discomfort, and inconvenience suffered by the victim. Per-incidence estimates of the first category of these costs are assembled from hospital records, records of visits to doctors' offices, records of prescription medication use, and surveys of victims of their out-of-pocket health care costs. Per-incidence estimates of lost productivity are usually based on the hourly wages paid to the victim, relying on the theoretical assertion that wages should reflect the marginal value of the victim's labor to his or her employer.

Estimation of the third category of value, the pain, discomfort, and inconvenience suffered by the victim, is more problematic, because there are few market prices or financial records that will reveal this value. Instead, the usual approach is to use stated preference techniques such as contingent valuation or stated choice

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approaches to estimate the victim's willingness to pay (WTP) to avoid an ill health outcome.[4]

What makes public health valuation unique among situations where nonmarket valuation techniques are applied is the implicit assumption that all cases of an ill health episode have the same value. In particular, it is usually assumed that the value of an ill health outcome does not depend on (1) the cause of that ill health outcome (so that, for example, a day suffering from itchy eyes and a stuffy nose caused by air pollution is valued the same as a similar episode caused by contaminated water at a swimming beach, (2) whether individuals in the population will avoid at most one incidence of an ill health outcome, or whether some individuals will avoid more than one (so that, for example, the value to an individual of avoiding 7 incidences of ill health is 7 times the value of avoiding one incidence), and (3) the health status of the individuals who will enjoy improved health (so that the value of avoiding an incidence of ill health to a person with chronic health problems is the same as the value to a person who rarely experiences ill health).

In contrast, for most other environmental goods, it is generally believed that the context of the good is critically important in determining its value. The marginal value of improving water quality in a lake depends on how many lakes will be protected. Oil pollution from a tanker spill is valued differently from oil pollution originating from natural seeps. In public health valuation, the issues of context and scale are typically assumed away.

The purpose of this chapter is to review available evidence on the validity of using constant per-episode and per-case values when valuing changes in public health due to changes in environmental quality. A second issue that will be explored is the validity of transferring health values estimated in one geographic region to an analysis conducted in another region. Relatively few environmental health valuation studies have been conducted, especially outside the U.S. Health values are routinely transferred between countries, with little guidance on how values might differ due to differences in health status, socioeconomic conditions, or culture.

2. VALUING ONE EPISODE VERSUS MANY EPISODES

At least for less-serious ill health outcomes, it is common practice in stated preference studies valuing health to value a discrete, marginal change in the number of episodes or cases of ill health that the respondent will experience, rather than valuing a change in risk of ill health. This approach is clearly unrealistic – future health cannot be guaranteed. Further, a risk-free treatment that focuses on health outcomes, rather than on risks, does not allow consideration of potential changes in defensive actions that the respondent might take, such as limiting activity during periods of poor air quality. On the other hand, valuing changes in risk imposes difficulties on both the respondent and the researcher. For this reason, most morbidity valuation studies have measured WTP to avoid, with certainty, one or more specific episodes or cases of ill health.