

Designer's Corner

Willingness-To-Pay (WTP): The New-Old Kid on the Economic Evaluation Block

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Cost-benefit analysis (CBA) is defined in the methodology literature as a form of economic evaluation whereby both costs and consequences are measured in monetary terms (Drummond, O'Brien, Stoddart, & Torrance, 1997). In recent years we have witnessed renewed enthusiasm for CBA and contingent valuation (CV) methodology, in particular the willingness-to-pay (WTP) approach to measuring the consequences of health-care programs (Diener, O'Brien, & Gafni, 1998; Klose, 1999). This renewed enthusiasm stems partly from the congruence between the empiric method used to measure the outcome (i.e., WTP) and the theoretical foundation of CBA in welfare theory (Mishan, 1971). This type of analysis also enables direct comparison of benefits and costs, as the two are measured in the same units. An added attraction of CBA is that the same principle of net benefit (i.e., benefit minus cost) can be applied to other sectors such as transport or environment, permitting intersectoral comparisons of resource use.

The maximum amount that an individual is willing to pay for goods or services is a common economics measure of the value of those goods or services to the individual. Yet only in recent years have we witnessed renewed enthusiasm for the use of WTP survey techniques in estimating monetary values for improved morbidity and mortality risks. As was observed as far back as a decade ago (Johannesson & Jonsson, 1991), environmental economics and health economics developed differently with respect to evaluation methods. While CBA (and WTP) has evolved into the most common method for valuing environ-

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mental benefits (including those related to health outcomes), health economics has developed in the direction of cost-effectiveness and cost-utility analysis. Furthermore, it is safe to say that CBA is the most common method of economic evaluation in all other content areas (e.g., transportation, agriculture).

Despite renewed enthusiasm for the WTP technique in health-care applications, there remain objections, resentment, and scepticism regarding its desirability and feasibility. The objections can be classified into four categories: theoretical; based on feasibility of measurement; based on misunderstanding of economic concepts; and emotional. My purpose here is to provide a *brief* review of the measure, describe a new instrument for the measurement of individual WTP, and respond to some of the criticisms raised. It is my hope that readers will be tempted to learn more about what I consider to be a very useful tool for evaluating health-care programs.

It should be pointed out that even though the question posed might vary little (e.g., what is the maximum amount the person is willing to pay for health-care products, programs, or improved well-being), one must distinguish among the uses to which the information will be put. One potential use is pricing and demand studies (e.g., market research). For suppliers of health-care goods and services in private markets, for example, forecasts of consumer demand as a function of price are valuable inputs to pricing and marketing decisions. We are not interested in this application here. We are interested in the use of WTP in the context of CBA. The question that CBA sets out to answer is whether a given number of health-care programs should be undertaken at all, and, if funds are limited, which programs among those predicated to generate surplus of benefits over costs should be selected. The focus of CBA is typically benefits produced and forgone in the economy as a whole — that is, the welfare of a defined society.

The rationale for economic evaluation arises from the economic concept of opportunity cost. Allocating scarce physical and human resources to an influenza vaccination program, for example, means forgoing the opportunity to use those resources in other welfare-enhancing ways. In this context, Williams (1983) defines economic evaluation as the process of “ensuring that the *value* of what is gained from an activity outweighs the *value* of what is sacrificed.” The WTP approach is a method for measuring an individual’s valuation of a program by asking that individual how much he or she is willing to pay (i.e., sacrifice) to have the program introduced. The alternative approaches of

time trade-off (TTO) and standard gamble (SG) are also based on the notion of sacrifice that underlies the opportunity-cost concept. However, WTP offers several advantages over these approaches, as will be described below.

Gafni (1991) and later O'Brien and Gafni (1996) suggested conceptual frameworks, involving a list of questions and considerations, to help in the interpretation or design of WTP studies in health care. Upon reviewing the considerations, the advantages of the WTP approach become apparent. Let me mention a few. The WTP technique can be modified to reflect the unique nature of health as a good and the market for health care. From the perspective of the individual, for example, the outcome of any health-care intervention is probabilistic. Hence the measurement of an individual's valuation of potential outcome must capture their attitude towards risk. Also, it has been shown that, in the case of health-care programs, outcomes are intrinsic to the individual and cannot be distributed among individuals. Hence social decision-making should also incorporate the individual's attitude towards risk (Ben-Zion & Gafni, 1983). Another distinguishing characteristic of the health-care market is unpredictability of personal demand. The institutional response to this uncertainty is the development of insurance (public or private). When the services provided are financed through an insurance (or taxation) mechanism, the WTP question should be adapted accordingly.

WTP is the only measure that can capture externalities — that is, one person's health status may affect another person's health status (e.g., transmission of tuberculosis) or utility (e.g., the case of compassion). The role of externalities is much more applicable to health-care consumption than to consumption of most other commodities. Hence when such effects exist, they should be included in the analysis when appropriate. Because the outcome is measured using monetary units (e.g., \$), WTP allows for direct cost-benefit comparison to determine the net benefit of the program. And because the same principle of net benefit can be applied to other sectors, such as education, transport, or the environment, intersectoral comparisons of resources can be made. None of these various comparisons are possible with other forms of economic evaluation. WTP also allows the individual to trade poor health for other commodities and does not restrict "sacrifices" to the domain of health (e.g., years of life in the TTO technique and risk of death in the SG technique). Finally, WTP is the most sensitive measure of outcome, as it does not make arbitrary assumptions about the indi-

vidual's preferences. For example, it allows an individual to reveal a preference for the short-term (say, 1 hour) reduction of severe pain.

As we have seen, the objections to WTP fall into several categories. Theoretical objections stem mainly from use of the neoclassical conceptual framework of welfare economics, also known as the welfarist approach, as the foundation for economic evaluation. In economics, when dealing with issues of resource allocation one usually begins by choosing an analytical framework to guide the analyses of the welfare consequences of a change in allocation. Thus the role of the welfarist approach in defining the proper methodology (and hence methods of measuring the costs, consequences, and decision rules) is a fundamental one in this field. The welfarist approach still dominates in economics. However, the longer we have a theoretical framework the more we will find out about its shortcomings and attempt to develop new approaches. The development of a new theoretic approach is unfortunately not an easy task, however, as can be seen from recent attempts. Like others (e.g., Weinstein & Manning, 1997), I believe that the debate about the proper conceptual foundation is not yet over and thus should be the focus of future research.

The WTP approach is not without problems, the recognition of which underlies the reluctance of some researchers to use it. It is important to note that many of these problems are *not specific to WTP* but are common to — though not usually acknowledged in — research that adopts alternative approaches to measuring individual valuations of a program. A typical criticism is the hypothetical nature of the question and the compensation mechanism. It should be mentioned that the hypothetical nature of the sacrifice is common to all types of measure (e.g., trading off years of life in the TTO measure or increased risk of death in the SG measure). The advantage of WTP is that although the exercise may be hypothetical, in that individuals are not required to make the payment implied in their responses, the "medium" through which the evaluation is expressed (i.e., payment) is one that individuals are already accustomed to on a daily basis. This cannot be said of trading years of life or risks of death.

I recently labelled one group of objections to the WTP approach as "emotional" (Gafni, 1998). Such objections are widespread but are difficult (or even impossible) to precisely define and quantify. They are nicely described by Weinstein and Manning (1997): "The major disadvantage of the benefit cost framework is the requirement that human lives and quality of life be valued in monetary units. Many decision

makers find this difficult or unethical or do not trust analyses that depend upon such valuations"; "Despite the implications of economic welfare theory, a number of members of the panel on Cost Effectiveness in Health and Medicine were unwilling to accept the equivalence of putting time costs in dollar terms in the numerator and subtracting the time from the QALYs [quality-adjusted life-years] in the denominator. Others were unwilling to value time costs at different rates for different groups." The latter quote illustrates vividly that individuals who are willing to accept the welfarist approach as the conceptual foundation for the analysis (i.e., the main source of the theoretical objection to WTP) may not be willing to accept the implications in terms of how one should measure costs and consequences (valuation of "time costs").

Furthermore, emotionally based objections are often vague and are not supported by evidence. For example, there is no evidence (e.g., survey of decision-makers) to support the argument that decision-makers find WTP unethical or difficult to conduct and do not trust analysis that values human lives and quality of life in monetary terms. Decision-makers (governments included) encourage and sometimes mandate the measurement of human lives and quality of life in monetary units in the context of CBA in areas such as transportation and the environment. It is not clear why the same decision-makers will not accept such valuations concerning health care.

With respect to the criticism about validity and feasibility, I agree with Kenkel (1997) that measurement methods have improved and that the practical experience gained from measuring QALYs has been used in some cases to advance the WTP measurement process. An example of a new WTP measurement instrument is the modified decision board (for details, see Gafni, 1997), a visual aid to help clinicians present information to their patients in an efficient and standardized manner. This method was first suggested by Levine, Gafni, Markham, and MacFarlane (1992) and used successfully to improve communication between doctors and patients in the case of adjuvant chemotherapy for early-stage breast cancer. Decision boards have since been developed and employed successfully with other patients at the point of decision-making. They have been modified to serve as WTP instruments and have been successfully used in research (Matthews, Birch, Gafni, & DiCenso, 1999; O'Brien et al., 1998). We recently used a computerized version in a study of dental care and found it to be very satisfactory. It is my belief that this "new-old" kid on the economic evaluation block has a great future.

References

- Ben-Zion, U., & Gafni, A. (1983). Evaluation of public investment in health care: Is the risk irrelevant? *Journal of Health Economics*, 2, 161–165.
- Diener, A., O'Brien, B., & Gafni, A. (1998). Health care contingent valuation studies: A review and classification of the literature. *Health Economics*, 7, 13–26.
- Drummond, M., O'Brien, B., Stoddart, G., & Torrance, G.W. (1997). *Methods for the economic evaluation of health care programs*. Oxford: Oxford University Press.
- Gafni, A. (1991). Using willingness-to-pay as a measure of benefits: What is the relevant question to ask in the context of public decision making about health care programs? *Medical Care*, 29, 1246–1252.
- Gafni, A. (1997). Willingness-to-pay in the context of economic evaluation of healthcare programs: Theory and practice. *American Journal of Managed Care*, 3, S21–S32.
- Gafni, A. (1998). Willingness-to-pay: What's in a name? *Pharmacoeconomics*, 14, 465–470.
- Johannesson, M., & Jonsson, B. (1991). Economic evaluation in health care: Is there a role for cost benefit analysis? *Health Policy*, 17, 1–23.
- Kenkel, D. (1997). On valuing morbidity, cost effectiveness analysis and being rude. *Journal of Health Economics*, 16, 121–128.
- Klose, T. (1999). The contingent valuation method in health care. *Health Policy*, 47, 97–123.
- Levine, M.N., Gafni, A., Markham, B., & MacFarlane, D. (1992). A bedside decision instrument to elicit a patient's preference concerning adjuvant chemotherapy for breast cancer. *Annals of Internal Medicine*, 117, 53–58.
- Matthews, D.C., Birch, S., Gafni, A., & DiCenso, A. (1999). Willingness-to-pay for periodontal therapy: Development and testing of an instrument. *Journal of Public Health Dentistry*, 59, 44–51.
- Mishan, E. (1971). *Cost-benefit analysis*. London: Allen & Unwin.
- O'Brien, B., & Gafni, A. (1996). When do the dollars make sense? Toward a conceptual framework for contingent valuation studies in health care. *Medical Decision Making*, 16, 288–299.
- O'Brien, B., Goeree, R., Gafni, A., Torrance, G.W., Pauly, M.V., Erder, H., Rusthoven, J., Weeks, J., Cahill, M., & LaMont, B. (1998). Assessing the value of a new pharmaceutical: A feasibility study of contingent valuation in managed care. *Medical Care*, 36, 370–384.
- Weinstein, M.C., & Manning, W.G. (1997). Theoretical issues in cost effectiveness analysis. *Journal of Health Economics*, 16, 121–128.
- Williams, A. (1983). The economic role of health indicators. In G. Teeling Smith (Ed.), *Measuring the social benefit of medicine* (pp. 63–68). London: Office of Health Technology Assessment.