

FROM THE PRESIDENT...

Compared to a year ago, when we were renegotiating the *JEEM* contract with Academic Press, this past half year of AERE management has been relatively sane. Major activities have been confined to the more constructive tasks of organizing the second World Congress and building the strength of AERE as an association that provides service to its members.

- Our annual luncheon and general meeting at the beautiful City Grill in Atlanta this past January was well attended. Results of the Fall elections for new officers and board of directors were announced: Anthony Fisher, president-elect; Catherine Kling, vice president; William Provencher and Laura Taylor, board members. We extend sincere thanks to John Loomis who served as vice president (and who continues to serve as co-editor of the AERE Newsletter) and to Mary Jo Kealy and George Parsons for their three years of service on the board. In addition, after eight years as treasurer, Ray Kopp stepped down and is succeeded by Ian Parry. Ray's service to AERE in this capacity is much appreciated.

- The award for the 2001 *Publication of Enduring Quality* was presented at the annual meeting. The award went to Thomas D. Crocker, for "The Structuring of Atmospheric Pollution Control Systems," in *The Economics of Air Pollution*, ed. H. Wolozin, (Norton, New York, 1966) pp. 61-86. Our thanks is extended to the members of the selection committee: Tim Haab (Chair), Gardner Brown, and Bob Deacon.

- The Second World Congress of Environmental and Resource Economists will be held in late June in Monterey, California. The Congress is jointly sponsored by AERE and EAERE and hosted by the Giannini Foundation of Agricultural Economics at the University of California (UC) at Berkeley and Davis together with the Donald Bren School of Environmental Science and Management at UC, Santa Barbara. I am thankful to all the members of the organizing and program committees for the World Congress, all of whom have played a tremendously important, and often unrecognized, role in making the Congress strong. Particular thanks are due to Michael Hanemann of Berkeley and Richard Carson of UC San Diego for the enormous amount of work they have put into making sure the Congress is a big success.

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- The AERE Board has turned its attention to several institution-building activities this year. One concerns the office of the Executive Secretary. Many members are unaware of the tremendous support provided to the association by Marilyn Voigt. Officers and board members come and go but not Marilyn – she provides much of the institutional memory for AERE and handles many of the administrative functions. Over the years, as AERE has grown, we have taken Marilyn’s role for granted, including her duties and compensation. An *ad hoc* group of board members and past AERE officers, chaired by Carol Adaire Jones, has been convened to evaluate and make recommendations to the board on the matter of staff support for AERE. In addition, this review will include an analysis of the overall administration of AERE, including improvement of services to members.

- At the January 2002 AERE Board meeting in Atlanta, the question of international affiliates of AERE was raised. Subsequently, and coincidentally, AERE has been approached by two organizations of environmental economists in regions of the developing world, enquiring about affiliating with AERE. This is new but exciting territory for AERE. As a major international association of environmental and resource economists (remember, the “A” in AERE does not mean “American”), it may well be appropriate to have regional branches, as has the Econometric Society. However, there may be a down-

side as well. Consequently, AERE is only at the exploration stage at this point. President-elect Tony Fisher is taking the lead on this.

- The June 2002 World Congress is not the only activity this summer. Although the annual workshop is not being held this year (due to the World Congress), the American Agricultural Economics Association (AAEA) meetings are being held July 28th - 31st in Long Beach, California. These are always good meetings, with strong AERE presence. And, as usual, AERE is hosting a reception for members. See the details on page five.

- The 2003 Winter meeting of the Allied Social Science Associations (ASSA) will be held in Washington, DC on January 3-5. We hope that many of our members will be able to attend.

- AERE has moved into the 21st century and has begun to use e-mail, when appropriate, to communicate with members. The AERE newsletter will be electronically distributed (no paper copy unless we do not have an e-mail address for you) and archived on the AERE web page (www.aere.org). Our policy is that e-mails will only be sent regarding AERE business. Exceptions may be made but, presumably, rarely. Furthermore, unlike our printed membership list, our e-mail list will not be sold, traded, or lent (except for special, approved exceptions). The AERE Directory is for member use in verifying addresses of individuals. Any other use is explicitly prohibited. In particular, the directory is not to be used for developing mass mailings to AERE members, without explicit prior permission of AERE. Please let me know if this is not working for you or if you have suggestions. Also, make sure the AERE business office has a current e-mail address when you renew. Check your current listing in the membership directory (David Austin’s renewal letter included the required password) and contact Marilyn at Voigt@rff.org if you wish to make a correction.

- The Board of AERE will be meeting at the World Congress. I welcome input from members regarding issues and concerns that should be brought before the board. Feel free to contact me.

See you in Monterey!

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AERE ANNOUNCEMENTS

NOMINATIONS FOR OFFICERS AND BOARD MEMBERS

This year, AERE members will vote for two new members of the Board of Directors who will serve for three years beginning in January 2003. The nominations are being handled by Cathy Kling, AERE VP, and the elections will occur in the Fall of 2002.

If you have a candidate whom you would like to see nominated, contact Cathy before the **July 1st deadline**. Nominations may also be made by the membership through petitions, each of which contains signatures of 5% of the association's members. **Such petitions should be sent to arrive no later than July 1, 2002 to:**

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PUBLICATION OF ENDURING QUALITY AWARD

The AERE Board of Directors will present the annual award (to co-authors if appropriate) for a publication of enduring quality that appeared at least five years prior to the year of the award. The award will be announced at the annual winter meeting luncheon in January 2003. Nominated works are to be evaluated on their seminal nature and enduring value. Place and type of publication are unrestricted, but posthumous awards will not be given. Nominees may include individuals who are not members of AERE. Evaluation of nominated works and final selection for the 2002 award will be undertaken by a committee chaired by Gardner Brown, University of Washington.

Nomination packages should consist of four copies each of a cover letter, a document supporting the nomination, and the publication itself. The supporting document (not to exceed three pages) should include

quantitative as well as qualitative information (e.g., number of citations or copies printed). Nominations should be sent to arrive **no later than September 1st**. This is an important award for AERE and for the recipients. Please give serious consideration to nominating a publication and to observing the submission requirements.

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WANTED: AERE WEBMASTER

AERE is looking for a new Webmaster to manage www.aere.org beginning November 2002. Maintaining the site requires less than one hour's work a week, plus an additional half-hour a week for about two months when job listings appear in the Fall. If you have any interest in this task please contact John Whitehead by e-mail (whiteheadj@uncwil.edu) or phone call (910-962-7497).

HOME PAGE

AERE can be found on the world wide web at: <http://www.aere.org>

The AERE Home Page is a valuable resource. It provides information about membership, the *Journal of Environmental Economics and Management (JEEM)*, a list of AERE members with web pages, the on-line edition of the *AERE Newsletter*, graduate programs in environmental and resource economics, meetings and workshops, job opportunities, on-line discussion lists, and WWW links of interest. Members may access the AERE Handbook and Directory using the membership code. (All members were sent a letter containing the code--please contact Marilyn M. Voigt (voigt@rff.org) if you have misplaced it. Send any and all comments regarding the web page to: **John Whitehead at whiteheadj@uncwil.edu**.

CALLS FOR PAPERS

International Atlantic Economic Society (IAES)

The 54th IAES conference will be held in Washington, D.C., October 10-13, 2002. The 55th IAES conference is to be held in Vienna, Austria on March 12-16, 2003. Sessions on the economics of natural resources will be organized in cooperation with Joe Lewis (U.S. Forest Service).

If you want to present a paper in an organized session on the economics of natural resources at the Vienna conference, please submit your abstract by e-mail either to M. Peter van der Hoek (vanderHoek@frg.eur.nl) or Joe Lewis (jlewis02@fs.fed.us). The submission deadline for the Vienna conference is October 1, 2002. The full paper should be available by six weeks prior to the conference.

You can visit IAES's web site (www.iaes.org) for more information. Please note that each participant is responsible for her/his own expenses and registration fees. However, the submission fee (\$75 for members, \$120 for nonmembers) will be waived for papers to be presented in an organized session.

Authors need to submit (by e-mail) a 250-500 word abstract (no full papers) including: (1) Title (60 character limit); (2) Objectives; (3) Data/Methods; (4) Results/Expected Results; (5) Conclusion. On a separate cover page list: (1) Conference location; (2) Name; (3) Academic rank or title; (4) Affiliation; (5) Mailing address; (6) Phone and fax numbers and e-mail address; (7) Category number of topic (see listing in the Journal of Economic Literature); (8) Indicate if the paper has primarily a macro or micro focus.

The International Research Foundation for Development (IRFD), Inc.

**Economy, Environment and Society
World Forum on Sustainable Development**

**A Parallel Event for the UN World Summit on
Sustainable Development (Rio+10)**

**August 27-28, 2002
Johannesburg, South Africa**

The International Research Foundation for Development, Inc. (IRFD) is inviting policymakers and planners, practitioners, academics, and representatives from governmental, nongovernmental and intergovernmental organizations, and community based organizations for a comprehensive forum on Sustainable Development. This forum will focus on a wide range of issues pertaining to scientific research (technical, economic, politico-cultural and social) implementation, good practices for replication, and creating viable partnerships for sustainable development among stakeholders at all levels.

For details and online registration: Please visit the IRFD website: <http://www.irfd.org>

Deadline for individual papers and session proposals/abstracts (150 words): May 25, 2002. Complete Paper no later than July 30th.

Early Registration by June 1, 2002. **Fees:** Developed countries U.S. \$150; Developing Countries U.S. \$75; Accredited NGO's U.S. \$40 per individual. **Late Registration** after June 1st, before July 31st, 2002: Developed countries: U.S. \$200; Developing Countries U.S. \$100; Accredited NGO's U.S. \$60. Paper presenters must complete their registration no later than July 31st in order to include their abstracts in the program.

U.S. Environmental Protection Agency (EPA) National Center for Environmental Economics (NCEE)

EPA's National Center for Environmental Economics (NCEE) is pleased to announce its new Working Paper Series. This series provides a forum for disseminating research produced or funded by NCEE. Papers in the series are either authored by NCEE researchers or produced with funding from NCEE. We welcome your submissions. Eligibility requirements, instructions for submitting papers, and working papers are available at www.epa.gov/economics (via a link in the News Alert box or the Our Publications link).

Questions? Contact Melonie Williams, Managing Editor (williams.melonie@epa.gov) or Kelly Maguire, Associate Editor (maguire.kelly@epa.gov).

MEETINGS AND CONFERENCES

AMERICAN AGRICULTURAL ECONOMICS ASSOCIATION (AAEA) ANNUAL MEETING

July 28-31, 2002
Long Beach, California

Registration and information about the meeting is available on the AAEA home page at: www.aaea.org or contact the AAEA office at 515-233-3202 for more information. Registration deadline is **June 29th** for reduced rates.

All AERE members are cordially invited to attend a reception on **Monday, July 29th** at the Westin Hotel from 8:30 to 11:00 p.m. in the Odessa Room.

AERE Sessions

Recreation Demand

Chair: Cathy Kling, Iowa State University

Papers:

“A Test of Choice Set Misspecification for Discrete Models of Consumer Choice” **J.R. Shazo, T.A. Cameron, and M. Saenz.** Presenter: J.R. DeShazo, University of California at Los Angeles (UCLA); Discussant: Maria Loureiro, Colorado State University.

“Bias in Welfare Measures as a Result of Improved Travel Cost Variable Estimates,” **C. Mohn, M. Hanemann, L. Pendleton, and C. Busch.** Presenter: Craig Mohn; Discussant: Cathy Kling, Iowa State University.

“How Serious is the Effect of Endogenous Stratification on Benefit Estimates from Travel Cost Demand Models: A Comparison of Visitor and Household Survey Responses and the Effectiveness of Correction Procedures,” **J. Loomis.** Presenter: John Loomis, Colorado State University; Discussant: Scott Shonkwiler, University of Nevada.

“A Recreational Model of Demand for Multi-Site Trips,” **J.R. DeShazo and M. Saenz.** Presenter: J.R. DeShazo, UCLA; Discussant: Peter Feather, U.S. Department of Agriculture (USDA)-Economic Research Service (ERS).

Land Economics

Chair: Kevin Boyle, University of Maine

Papers:

“Public Preferences for Open Spaces: Evidence from Land Preservation Ballot Initiatives,” **K. Bell, and E. Irwin.** Presenter: Kathleen Bell, University of Maine; Discussant: Jill McCluskey, Washington State University.

“Market Based Instruments to Control for Urban Sprawl,” **A.M. Bento and S. Franco.** Presenter: A. Bento, University of California at Santa Barbara; Discussant: Stephen Swallow, University of Rhode Island.

“Hedonic Estimation and Economic Geography,” **P.E. Hess.** Presenter: P. Hess, University of California at Berkeley; Discussant: Kevin Boyle, University of Maine.

Topics in Environmental Economics

Chair: Jill McCluskey, Washington State University

Papers:

“Other People’s Money: A Modigliani-Miller Theory of ‘Responsible’ Corporate Behavior,” **A.A. Small and J.G. Zivin.** Presenter: A. Small, Columbia University; Discussant: Michael Roberts, USDA-ERS.

“Environmental Uncertainty and the Timing of Environmental Policy,” **J-D. Saphores.** Presenter: J-D Saphores, University of California at Irving; Discussant: W. Douglass Shaw, University of Nevada.

“How Trade Saved Humanity from Biological Exclusion: The Neanderthal Enigma Revisited and Revised,” **R. Horan, E. Bulte, and J. Shogren.** Presenter: Richard Horan, Michigan State University (MSU); Discussant: Frank Lupi, MSU.

**International Society for Ecosystem Health
and the
Center for Applied Biodiversity Science
at Conservation International**

**Healthy Ecosystems, Healthy People:
Understanding the Linkages Between Biodiversity,
Ecosystem Health and Human Health Conference**

**June 6-11, 2002
Marriott Wardman Park Hotel
Washington, D.C.**

Experts in conservation, biodiversity, biology, public health, geology, among other fields will gather to discuss how these critical linkages can be understood and translated into policy. Speakers include: E.O. Wilson, David Schindler, Robert Finkelman, Paul Ehrlich, Theo Colburn, Andrew Dobson, Virginia Dale, Carlos Santos Burgoa, and Rosina Bierbaum.

This conference is sponsored by: The World Health Organization, John E. Fogarty International Center, UNEP, NIEHS, Conservation International as well as many other organizations. For more information, visit the conference website: www.ecosystemhealth.com/hehp

**SECOND WORLD CONGRESS
OF ENVIRONMENTAL AND
RESOURCE ECONOMISTS**

**Monterey, California
June 24-27, 2002
Monterey Marriott Hotel**

WORLD CONGRESS – WORLD CLASS EVENT!

Almost 800 people have now registered to attend the World Congress of Environmental and Resource Economists in Monterey, California this June. They are coming from more than 40 countries in Africa, Central and South America, Asia, and Australasia, as well as Europe and North America.

The Congress begins with registration and a no-host reception at the Marriott from 5:00 to 8:00 p.m. on Sunday, June 23rd. The Congress sessions begin at 8:00 a.m. on Monday, June 24th and run through the afternoon of Thursday, June 27th. There will be a keynote speech at noon each day; the keynote speakers are Partha Dasgupta, Daniel McFadden, Martin Weitzman and Kenneth Arrow. The preliminary program is now available on the Congress web site at: <http://weber.ucsd.edu/~carsonvs/>. There are over 150 special paper sessions, panels, and mini-workshops covering a vast range of topics involving all aspects of environmental and resource economics.

There is also an active social program featuring a Gala Dinner at the world famous Monterey Bay Aquarium at 7:30 p.m. on Monday June 25th. A number of optional tours have been arranged, and details can be found on the Congress web site. If you would like to bring your children with you to Monterey, we are arranging some activities and trips designed specifically with children in mind. Also, in case you are interested, the 17th Annual Monterey Bay Blues Festival is taking place June 21st - 23rd. When the Blues Festival ends, the World Congress takes over!

Michael Hanemann

ESSAY

On Quality Adjusted Life Years (QALYs) and Environmental/Consumer Safety Valuation

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I. Introduction

A quality-adjusted life year (hereafter a QALY) is a measure of the performance of medical treatments and interventions that captures in a single metric two important dimensions of medical outcomes: the degree of improvement in health, and the time interval over which the improvement occurs, including any increase in the duration of life itself.¹ Duration is measured in years of life; and quality is indexed by a number between 0 and 1 with 0 representing death and 1 representing perfect health. So a treatment that is expected to increase the duration of life by 1 year of perfect health is said to produce 1 QALY. A treatment that improves health status from an index number of 0.25 to 0.75 for two years also produces 1 QALY. And a treatment that extends a life by 5 years at a quality level of 0.4 produces 2 QALYs. In the evaluation of alternative health policies or treatment programs, the numbers of QALYs produced for each patient or recipient of treatment are simply added up to obtain an aggregate measure of program effectiveness.

¹ Most of what is said in this *Essay* about QALYs applies also, with appropriate modification, to the related concept of Disability Adjusted Life Years.

Fabian (1994) traces the concept of a QALY to a paper by Zeckhauser and Shepard (1976). Torrance (1986) provides a review of the literature which suggests earlier antecedents of the concept in the literature on public policy evaluation. There has been a substantial literature produced on the subject over the past 20 years. The sources cited in this *Essay* provide many additional references to this literature.

QALYs can be used to compare the effectiveness of different types of medical interventions and treatments for a given disease. For example, QALYs can be used to compare a treatment that has a substantial impact on health quality and no effect on life expectancy with a different treatment that results in no change in health quality but a longer life expectancy. QALYs can also be combined with information on the costs of alternative treatments and medical programs to assess their cost effectiveness in an effort to achieve a more efficient utilization of medical resources. More resources can be allocated to programs that show lower cost per QALY relative to other programs.

Might QALYs play a similar role in the evaluation of environmental health and safety policies? In its review of the U.S. Environmental Protection Agency (EPA) National Center for Environmental Assessment's Comparative Risk Assessment Methodology, a Committee of the EPA's Science Advisory Board said, "The Committee is enthusiastic about the overall analytical structure ..., in particular, the concept of ... the "quality-adjusted life year ... (U.S. Environmental Protection Agency, 1999, p. 10)," although it also went on to say that other alternatives should also be considered and evaluated. But the EPA Guidelines for Preparing Economic Analyses are much less enthusiastic about QALYs. They relegate them to a footnote, saying "... these measures have not been fully integrated into the welfare economic literature on risk evaluation (U.S. Environmental Protection Agency, 2000, p. 91n)." Given these different views, it seems timely to examine the potential usefulness of QALYs in environmental policy evaluation. Specifically, in this *Essay*, we consider two questions:

- What are the advantages and disadvantages of QALYs relative to standard economic evaluation measures based on willingness to pay/accept (WTP/A) in the economic assessment of health policy?
- Do QALYs have a potential role in assessing the health benefits of environmental and consumer safety policy?

The answers to these questions depend in part on whether QALYs have a sound basis in economic theory. They depend also, in part, on whether their use poses less severe measurement problems than standard economic WTP measures.

In the next section, a brief description of how QALY measures are obtained is presented. Then, their relationship to the standard neoclassical welfare economic paradigm is described. We will see that QALYs, like WTP, are based on individuals' preferences regarding health status and longevity. But they impose some serious restrictions on the properties of the utility or preference functions of individuals. The two questions raised above will then be addressed.

II. Measuring QALYs for Alternative Health States

Many of the earliest papers on this topic relied on the judgements of medical professionals to provide the quality weights for different health states (Torrance, 1984). But the preferred approach is to obtain the weights by some form of questioning of a sample of individuals representative of the population of interest.² There are three principal approaches to asking questions in order to elicit values or weights.³ They all start with a description of a health state including symptoms, degree or level of pain, degree of impairment of activity or function, and so forth (Gold, et al., 1996; Fabian, 1994).

In the simplest form of questioning, respondents are simply asked to assign a weight or numerical value between one and zero that reflects the utility they assign to the health state relative to states of perfect health and of death, respectively. Often, respondents are provided with a visual aid such as a horizontal line with a scale between zero and one marked on it.

The second approach is known as the "time-tradeoff" approach. Respondents are asked to choose between two options: living in a given state of less than perfect health for a fixed period of time (T), for example, five years, and living a shorter period of time (N) in perfect health. The number of years of perfect health is varied until the individual expresses indifference

² This simple statement papers over an important issue: whether the questions should be asked of people experiencing the health state being evaluated or of healthy individuals. For further discussion, see Gold, et al. (1996), pp. 69-74.

³ Other forms of tradeoff and rating questions have been used occasionally. See, for example, Nord (1992).

between the two options. The value or weight attached to the impaired health state is simply N/T .

The third approach to questioning is the standard gamble question derived from the method first outlined by von Neumann and Morgenstern for eliciting cardinal utilities. Respondents are asked to choose between two options, where option A is living with the impaired health state with certainty for the rest of one's life, and option B is a gamble in which one outcome is living for the same period of time in perfect health (with a probability of p) and the other outcome is death (with a probability of $1 - p$). The probability is then varied until the individual expresses indifference between the gamble and the given health state with certainty. This means that the expected utilities of the two choices are equal. The quality weight for the given health state is simply the probability (p) that makes the individual indifferent between the two choices.

III. QALYs and Utility Theory

Advocates of the use of QALYs in policy evaluation cite as one advantage of the concept that QALYs are based on individuals' preferences.⁴ And to the extent that QALYs are derived from the responses of representative individuals, there is something to this claim. But as several authors have shown, given the way that QALYs are used in policy evaluation, they are consistent with utility theory and the economic theory of individual preferences only if individuals' utility functions and preference structures satisfy some quite restrictive conditions. We will use some examples to illustrate the nature of some of these restrictions. For further discussion and illustration, the reader should consult Broome (1993), Johannsson (1995), Fabian (1994), Garber et al. (1996), Johnson and Lievense (2000), and Hammitt (2000a).

For QALYs to represent an individual's preferences over risks of changes in health and longevity, his preferences must satisfy several restrictive conditions (Pliskin et al., 1980; Bleichrodt et al., 1997). The first is "risk neutrality" over longevity, which means that an individual is indifferent to any mortality risks that do not affect his life expectancy. For example, he is indifferent between living 25 more years for certain, and a gamble offering a 50% chance of living 50 more years and a 50% chance of dying immediately.⁵

⁴ In fact, Torrance (1986) uses the terms "health state utilities" and QALYs interchangeably.

⁵ Pliskin et al. (1980) define an alternative form of QALY that can account for other risk postures (constant proportional risk aversion or constant proportional risk

The second condition is “constant proportional tradeoff” (of longevity for health), which implies that the fraction of remaining longevity an individual would trade to improve his health from one state to another (for the rest of his life) does not depend on his longevity. For example, if he is willing to give up ten of 50 remaining years to improve his health from “fair” to “excellent,” he would also be willing to give up one of five remaining years for the same health improvement. Alternatively, if future QALYs are discounted (as is recommended practice; Gold et al., 1996), then it is the fraction of discounted longevity an individual is willing to give up that must remain constant (Johannesson et al., 1994). Johnson and Lievense (2000) cite evidence suggesting the assumption of constant proportional tradeoff is unduly restrictive.

An additional condition is that an individual’s preferences for health and longevity are “utility independent” of his wealth and future income, which means that his preferences for risks that affect health or longevity do not depend on income. This assumption implies that the effect of income on utility is positively related to the quality weight for each health state. There is little empirical information available on this point, although the notion that the marginal utility of income is smaller in impaired health than in full health is consistent with one study (Sloan et al., 1998).

Because QALYs impose restrictive assumptions on preferences, the ranking of health interventions using QALYs may differ systematically from the ranking using WTP. For example, the relative value of reducing mortality risk within the current year to different people is proportionate to life expectancy, which suggests the value of reducing risk to a 20 year old is about three times larger than the value of reducing risk to a 65 year old.⁶ In contrast, individual WTP to reduce mortality risk does not fall as sharply with decreasing life expectancy, and may even increase as life expectancy declines over some range of ages. Under the WTP approach, it is not necessarily more valuable to reduce mortality risk to a younger person, and in any case the differential value assigned is likely to be smaller than under the QALY

proneness), but these alternatives are also restrictive and are rarely if ever used in practice.

⁶ The life expectancies of North American 20 and 65 year olds are about 58 and 18 years, respectively. Discounting future QALYs reduces the relative value of reducing mortality risk to the 20 year old, and accounting for decreasing average health with age increases the relative value.

approach. WTP to reduce mortality risk does not fall in proportion to life expectancy because the opportunity cost of spending on risk reduction also falls with decreasing life expectancy, as the individual has less to save for (see Hammitt, 2000b and Ng, 1992).

For another example, consider two alternative treatments or interventions, one of which yields an improvement in health status for next year of 0.5 and while the other extends life by six months of perfect health. They both produce a half a QALY. And if the improvement in health status lasts for 4 years and the increase in healthy life duration is 2 years, they both produce 2 QALYs. Independent of the discounting issues discussed above, this implies that the marginal valuations of health status and of longevity are both constant (i.e., risk neutrality). It also implies that the marginal valuation of health status is independent of longevity and vice versa (i.e., mutual utility independence). This means that, for example, a year of perfect health for an individual at age 80 has the same QALY value as a year of perfect health for that person at age 40, despite the more restricted range of activities available to the 80 year old. These are all restrictive assumptions in economic terms.

This discussion suggests that, although QALYs are consistent with economic theory, they require that preferences satisfy a number of quite restrictive conditions. This means that policy choices based on QALYs might at least in some cases be different from policy choices based on willingness to pay measures.

IV. QALYs in Environmental and Consumer Safety Policy Making - an Assessment

There are really two questions here: (i) are QALYs useful in economic assessments of policies in general? And (ii) do they offer any special advantages in the evaluation of environmental and consumer safety policies that affect human health?

As for the first question, QALYs share a common characteristic with economic WTP measures in that they combine in an understandable way information about both the duration of life and health status in a single number. And for this reason they facilitate the comparison of policies or programs that have quite different characteristics in these two dimensions. At least when QALY weights are derived from questioning representative samples of the lay public (as opposed to health professionals), they can be said to have a basis in individuals’ preferences.

However, as discussed in Section III above, the connection to individuals’ preferences is not strong. That is

to say, QALYs are consistent with economic preferences only if those preferences have quite restrictive and unpalatable (from an economic perspective) properties such as a rate of substitution between longevity and health that is independent of income and of longevity, and risk neutrality with respect to longevity. These restrictions mean that using QALYs to rank policies with quite different patterns of health status and longevity changes could lead to quite different results compared to rankings based on comparisons of benefits and costs.

Since QALY weights are based on responses to hypothetical questions, they are susceptible to the same kinds of criticisms as value measures based on contingent valuation or other stated preference methods. Relatively little effort has been devoted to tests of the validity of QALY weights, and validity tests are difficult to design (Nord, 1992). QALY weights are also known to be sensitive to framing effects and to question format (Nord, 1992; Kaplan, 1996; Gold, et al., 1996). If respondents are actually risk averse or have positive time preference, this can independently affect responses to different kinds of standard gamble and time-tradeoff questions (Pliskin et al., 1980; Nord, 1992). There is, however, some reason to believe that QALY weights might be assessed more reliably than stated preference estimates of WTP. Unlike WTP, QALY weights are naturally bounded (between zero and one). Moreover, respondents may find it easier to judge tradeoffs between health and longevity than between these attributes and money. However, in the absence of evidence to the contrary, we can not conclude that QALYs are more valid representations of individuals' preferences than stated preference WTP measures of value.

For policymaking, QALYs may be perceived as more equitable than WTP, because they treat a gain in health or longevity equally, regardless of the individual's wealth or income. In contrast, WTP often increases with ability to pay. In practice, however, this difference is not a factor because the health effects of policies can be (and usually are) valued using some population-average WTP.

Despite these reservations about QALYs, is there a potential role for them in the economic assessment of environmental and consumer safety policies affecting health? In some circumstances, there may be a limited potential role. Suppose an environmental policy is predicted to reduce the number of days individuals experience acute respiratory symptoms. Further suppose that there are estimates of the WTP to avoid asthma attacks but not to avoid acute respiratory symptoms. If it were known, the ratio of QALY weights for a day of acute respiratory symptoms and for an asthma attack could be

used to scale the known WTP in a form of benefits transfer exercise. Some of the restrictive assumptions about preferences discussed above would not seem to be serious where the two endpoints do not entail differences in life expectancy or duration of symptoms. Johnson et al. (1997) propose a similar approach to calculating WTP based on the Quality of Well-being (QWB) index.

However, most of the QALY weights are for more serious diseases of longer duration and for various degrees of long term disability or impairment.⁷ One could propose to do the primary research to estimate the QALYs for the relevant health endpoints. But this is unlikely to be any easier or any better than doing the primary research to estimate the relevant WTP values directly. And there is some question about whether QALYs, which are measured in years, can be reliably applied to short term acute diseases that have durations of a few days at most (U.S. Environmental Protection Agency, 1999, pp. 22, A-18).

V. Conclusions

QALYs are not a panacea for the conceptual and empirical difficulties in assessing and evaluating environmental policies that affect health. Where WTP estimates of health values are available, they are likely to be superior reflections of individuals' preferences. Even though a limited role for QALYs have been identified in some kinds of benefits transfer exercises where WTP values are not available, we have not found QALY weights for the most relevant health endpoints. And we think that using limited research resources to obtain QALY weights would not be wise, since the cost of that line of research is the lost opportunity to obtain better WTP values.

References:

- Bleichrodt, Han, Peter Wakker, and Magnus Johannesson. 1997. "Characterizing QALYs by Risk Neutrality," Journal of Risk and Uncertainty, vol. 15, pp. 107-114.
- Broome, John. 1993. "Qalys," Journal of Public Economics, vol. 50, no. 2, pp. 149-167.

⁷ See, for example, Nord (1992) and Tolly, Kenkel, and Fabian (1994).

- Fabian, Robert. 1994. "The QALY Approach," in George Tolley, Donald Kenkel, and Robert Fabian, eds. Valuing Health for Policy: An Economic Approach. Chicago: University of Chicago Press.
- Garber, A. C., et al. 1996. "Theoretical Foundations of Cost Effectiveness Analysis," in Marthe R. Gold, et al., eds. Cost-Effectiveness in Health and Medicine: Report to U.S. Public Health Service by the Panel on Cost-Effectiveness in Health and Medicine, U.S. Department of Health and Human Services.
- Gold, Marthe R., et al. 1996. "Identifying and Valuing Outcomes," in Marthe R. Gold, et al., eds. Cost-Effectiveness in Health and Medicine: Report to U.S. Public Health Service by the Panel on Cost-Effectiveness in Health and Medicine, U.S. Department of Health and Human Services.
- Hammitt, James K. 2000a. "QALYs v. WTP," Paper presented at the Society for Risk Analysis annual meeting, Washington, DC.
- Hammitt, James K. 2000b. "Valuing Mortality Risk: Theory and Practice," Environmental Science and Technology vol. 34, no. 8, pp. 1396-1400.
- Johannesson, Magnus, Joseph S. Pliskin, and Milton C. Weinstein. 1994. "A Note on QALYs, Time Trade-off, and Discounting," Medical Decision Making, vol. 14, pp. 188-193.
- Johansson, Per-Olov. 1995. Evaluating Health Risks: an Economic Approach. Cambridge: Cambridge University Press.
- Johnson, F. Reed, Erin E. Fries, and H. Spencer Banzhaf. 1997. "Valuing Morbidity: An Integration of the Willingness-to-Pay and Health-Status Index Literatures," Journal of Health Economics, vol 16, pp. 641-665.
- Johnson, F. Reed, and Katharine Lievense. 2000. Stated-Preference Indirect Utility and Quality-Adjusted Life Years. Prepared for Health Canada. Durham, N.C.: Triangle Economic Research.
- Kaplan, Robert M. 1996. "Utility Assessment for Estimating Quality-Adjusted Life Year," in Frank A. Sloan, ed., Valuing Health Care: Costs, Benefits, and Effectiveness of Pharmaceuticals and Other Medical Technologies. Cambridge: Cambridge University Press.
- Ng, Y.-K. 1992. "The Older the More Valuable: Divergence Between Utility and Dollar Values of Life as One Ages," Journal of Economics vol. 55, pp. 1-16.
- Nord, Erik. 1992. "Methods for Quality Adjustment of Life Years," Social Science Medicine, vol. 34, no. 5, pp. 559-569.
- Pliskin, Joseph S., Donald S. Shepard, and Milton C. Weinstein. 1980. "Utility Functions for Life Years and Health Status," Operations Research, vol. 28, pp. 206-224.
- Sloan, Frank A., et al. 1998. "Alternative Approaches to Valuing Intangible Health Losses: The Evidence for Multiple Sclerosis," Journal of Health Economics vol. 17, pp. 475-497.
- Tolley, George, and Robert Fabian. 1994. "Future Directions for Health Value Research," in George Tolley, Donald Kenkel, and Robert Fabian, eds. Valuing Health for Policy: An Economic Approach. Chicago: University of Chicago Press.
- Tolley, George, Donald Kenkel, and Robert Fabian. 1994. "State-of-the-Art Values," in George Tolley, Donald Kenkel, and Robert Fabian, eds. Valuing Health for Policy: An Economic Approach. Chicago: University of Chicago Press.
- Torrance, George W. 1986. "Measurement of Health State Utilities for Economic Appraisal: A Review," Journal of Health Economics, vol. 5, no. 1, pp. 1-30.
- U. S. Environmental Protection Agency. 1999. An SAB Report on the National Center for Environmental Assessment's Comparative Risk Framework Methodology: A Review by the Drinking Water Committee, Washington, DC: U. S. Environmental Protection Agency.
- U. S. Environmental Protection Agency. 2000. Guidelines for Preparing Economic Analyses, Washington, DC: U. S. Environmental Protection Agency.
- Zeckhauser, Richard J., and Donald Shepard. 1976. "Where Now for Saving Lives?" Law and Contemporary Problems, vol. 40, no. 4, pp. 5-45.

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ECONOMICS OF URBAN SPRAWL AND LAND USE CHANGE

The Donald Bren School of Environmental Science and Management at the University of California (UC), Santa Barbara has organized a one-day short course on the “Economics of Urban Sprawl and Land Use Change” just prior to the World Congress of Environmental and Resource Economists **on June 22nd (from 8:00 a.m. to 6:00 p.m.)**. This event is free of charge, yet space is limited. For more information, please consult the link to “Side Events” posted on the World Congress Web Page via www.aere.org.

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