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Policy Brief - What's in a Name? A Search for Alternatives to "VSL"

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Abstract

Benefit-cost analyses of environmental, health, and safety regulations often rely on an estimate of the value of statistical life (VSL) to calculate the aggregate benefits of reducing human mortality risk. The VSL represents the marginal rate of substitution between mortality risk and money.

Although this concept is well-understood by economists, it is viewed by many non-economists as confusing technical jargon that borders on the immoral. Based on focus groups and a quantitative ranking exercise, this article describes a systematic approach for identifying and testing alternatives to the VSL terminology, with the goal of identifying an alternative term that more clearly communicates the VSL concept to a broad audience.

Keywords

value of statistical life; mortality risk valuation; terminology; focus group

INTRODUCTION

Benefit-cost analyses (BCA) of environmental, health, and safety regulations often rely on estimates of the value of statistical life (VSL) to calculate the aggregate benefits of reducing human mortality risk. The VSL represents the marginal rate of substitution (MRS) between mortality risk and money -- i.e., the willingness-to-pay (WTP) for small risk reductions. Although this concept is well-understood by economists, it is viewed by many non-economists as confusing technical jargon that borders on the immoral (Cameron 2010).

Misperceptions about the meaning of the VSL may stem partly from the way benefits are reported in regulatory analyses where the VSL is commonly applied. Individual reductions in mortality risks that are associated with a policy are typically aggregated over the affected

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population and reported as “lives saved.” The valuation estimates associated with these risk reductions are then aggregated to match the units of the “lives saved” measure. This approach obscures the underlying individual-level risk reductions that result from a policy, thus leaving the general reader with the impression that the VSL is being used to place a value on human lives. In their list of criticisms of U.S. agencies that conduct BCA as part of regulatory analyses, Heinzerling and Ackerman (2002) include the “confusion between the valuation of risk and the valuation of life itself.” This misperception of what the VSL represents can lead to incredulity and consternation, making it difficult to communicate—to both policy makers and the general public—the WTP for reductions in mortality risks.¹

This Policy Brief seeks to address this challenge by systematically evaluating potential alternatives to the VSL terminology and identifying a term that better communicates to the general public the concept of the marginal rate of substitution between mortality risk and money. In the next section, we present some historical background that illustrates how the VSL has been misunderstood. This is followed by two sections that describe our process for evaluating alternative terms, which involved conducting seven focus groups and a quantitative analysis of rankings provided by participants. We conclude that the “value of reduced mortality risk” (VRMR) may be a more effective and more easily understood alternative to the VSL.

A HISTORY OF MISUNDERSTANDING

Two prominent media incidents illustrate common misunderstandings about the VSL and their ability to affect policy. In 2003, environmental organizations criticized the U.S. Environmental Protection Agency (EPA) analysis of a proposed air pollution regulation because it adjusted the VSL to account for differences in remaining life expectancy among affected individuals (NRDC 2003). This adjustment, which the press called the “senior death discount,” was reported by many media outlets, including *National Public Radio*,² the *New York Times*,³ the *Wall Street Journal*,⁴ and the *Washington Post*.⁵ These news stories left readers with the impression that the federal government valued the lives of senior citizens less than the lives of younger individuals. Ultimately, public pressure, led by the American Association of Retired Persons, prompted an amendment to the 2004 Appropriations Bill that prohibited the EPA from making such adjustments.

Similarly, in 2008, the Associated Press (AP)⁶ reported that the EPA had lowered its VSL estimate for seemingly political purposes, first applying the new estimate in its analysis of the 2004 regulation of non-road diesel engines (USEPA 2004). In fact, the VSL was lower because it incorporated new evidence from meta-analyses published in the peer-reviewed literature. Although the AP article briefly described the risk-income tradeoffs that form the

¹Cameron (2010), Banzhaf (2014) and Dockins et al. (2018) provide a detailed description of the history of the use of the VSL terminology in economics and public policy, as well as an account of the difficulties faced by agencies using the term when the news media or public misunderstand the term’s intent and thus agencies’ policy evaluations.

²Joseph Shapiro, “EPA Criticized for Plan to Reduce Value of Seniors Lives,” *National Public Radio’s Morning Edition*, May 5, 2003. Available at: <https://www.npr.org/templates/story/story.php?storyId=1252109>

³Katharine Q. Seelye and John Tierney, “E.P.A. Drops Age-Based Cost Studies,” *New York Times*, May 8, 2003

⁴John J. Fialka, “Chief U.S. Regulator Attempts to Find Value of Human Life,” *Wall Street Journal*, May 30, 2003

⁵Cindy Skrzycki, “Under Fire, EPA Drops the ‘Senior Death Discount,’” *Washington Post*, May 13, 2003

⁶Seth Borenstein, “AP Impact: An American Life Worth Less Today,” *USA Today*, July 11, 2008

basis for the VSL and even used the VSL terminology, most of the language mistakenly equated valuing small risk changes with valuing life itself. Carried by numerous media outlets,⁷ the article immediately caught the attention of legislators, culminating in the introduction of a bill in the U.S. Congress, “*The Restore the Value of Every American in Environmental Decisions Act*,” 69 days after the article’s publication. Senator Barbara Boxer stated, “The EPA’s decision to reduce the worth of a human being when they consider the benefits of new environmental regulations was outrageous, and this bill will ensure that it never happens again.”⁸ Although there was ultimately no Congressional action on the bill, the EPA nevertheless reverted to the VSL estimate that was used prior to the Non-road Diesel Rule, which it continues to use today.⁹

In the wake of the AP article, several alternatives to the VSL terminology have been suggested, but to our knowledge none of these have been developed using a systematic method and none have been shown to communicate the underlying concept better than VSL.¹⁰

FOCUS GROUPS

To evaluate alternatives to VSL, we first conducted seven focus groups: three with adults recruited from the general population in the Washington, DC metropolitan area and four with samples of non-economist employees of the EPA. Each focus group contained 9 to 10 participants.¹¹

Elicitation of Alternative Terms from the General Population

The general-population focus groups were designed to elicit alternative terms that might be suitable replacements for the VSL. First, participants read and discussed an example news article that was intended to help them understand what the VSL measures and how it is used in public policy analysis. Next, participants were asked to provide feedback on the component words of the VSL and suggest possible alternatives that would be clearer or preferred.

The discussions during these first three focus groups provided many insights, including the strong impression that when used together, “value,” “statistical,” and “life” were not preferred by participants and did not accurately describe the concept. Specifically, participants indicated that using “value” and “life” together provokes a strong emotional response and gives the impression of valuing a specific, individual life. They further suggested that the terminology would be better if it included words that describe the monetary component, convey the risk’s fatal nature, and indicate that the risk is being

⁷This included a comedy news segment by Stephen Colbert: The Colbert Report, “The Word – Priceless,” July 14, 2008. Available at: <http://www.cc.com/video-clips/e8zxmm/the-colbert-report-the-word---priceless>.

⁸See <https://www.epw.senate.gov/public/index.cfm/press-releases-democratic?ID=7856688E-802A-23AD-43D9-C49725DE021E>

⁹The Agency adjusts its VSL estimate for inflation and income growth over time.

¹⁰Alternative terms that have been suggested or used in the literature include “willingness to swap” and “value of a micromort” (Cameron 2010), “value of a risk reduction” (Scotton and Taylor 2011), “value of mortality risk” (USEPA 2016), and “value of prevented fatality” (UK Department for Transport 2017).

¹¹See Dockins et al. (2018) for details about focus group recruitment and procedures.

reduced not prevented. Finally, they emphasized that any replacement term should be concise and non-technical.

The feedback provided by participants in the first three focus groups was not sufficient to identify one specific, best term. However, several similar phrases seemed to be preferred by a plurality of participants (some of the participant' reasoning appears in parentheses):

- value of prevented fatality (“...simple, clear ...”, “...value is more positive...”)
- value of mortality risk reduction (“...I preferred...a technical term versus an emotional term... [not] anything related to fatality, life...”)
- benefit of mortality risk reduction (“...straightforward...non-emotional...”)
- benefit of reducing risk (“...plain, simple...”).

Development of List of Candidate Terms

Based on the feedback from the first three focus groups, we identified “building block” words to describe the three key components of the VSL concept: monetization, endpoint (i.e., mortality risks), and change in risk (as opposed to the prevention of death). The building block words were combined to form a list of 17 candidate terms, including VSL (see Table 1). Each candidate term includes the three key components, as well as an indication of the type of risk change to increase clarity and more closely reflect the nature of risk changes that are typically associated with environmental and public health regulations.

Formal Ranking by EPA Focus Groups

The terms were then used in a formal ranking exercise with three of the EPA (non-economist) employee focus groups. After completing exercises to learn about the concept underlying the VSL, each participant was given 17 cards printed with the candidate terms and instructions to arrange the cards from most to least preferred, to identify ties by placing cards in the same row, and to indicate terms considered “acceptable” versus “unacceptable.” Participants in these focus groups consistently ranked “value of improved chance of survival” (VICS) or a version of “value of reduced mortality risk” (VRMR) near the top, stating that these terms were less “sciencey” or “jargony” and simpler. VSL consistently ranked at or near the bottom. Based on feedback from these three focus groups and the ranking exercises, we added more terms that included “survival” as well as alternatives to the word “mortality,” including “fatality” and “death.”

Next, we conducted a fourth focus group with EPA employees. The ranking procedure in this final focus group was modified so that participants first ranked the newly added alternative terms before ranking the terms from the original list of 17. As in the first three EPA focus groups, the highest ranked term was “value of improved chance of survival.” Among the remaining terms, those containing “mortality” tended to outrank those containing “fatality” or “death.”

SYSTEMATIC ANALYSIS OF RANKINGS

Next, we conducted a systematic analysis of all participants' rankings to determine which terms were preferred by our focus groups as a whole. The EPA focus groups produced 36 complete rankings of a common set of 17 terms. We compared the relative rankings of all potential pair-wise combinations (i.e., two combinations at once) of terms to identify those that would defeat all others in a head-to-head vote (i.e., those in the dominant set) by the full sample of EPA focus group participants. To examine robustness, we drew 10,000 "bootstrap" samples—each comprising 36 rankings, drawn (with replacement) from our original sample—to estimate the frequency with which each term would appear in the dominant set in repeated trials.

Results

We found that "value of improved chance of survival" (VICS) was the single dominant term in the original sample, and it appeared in the dominant set in 96 percent of the bootstrapped samples, based on all four EPA focus groups (see column 3, Table 1). This dropped to 83 percent when we excluded the fourth EPA focus group because of differences in the ranking directions given to participants. When we excluded VICS from the candidate list, "value of reduced mortality risk" (VRMR) was the single dominant term in the original sample and appeared in the dominant set in 81 percent of the bootstrapped samples (see column 5, Table 1).

VRMR as an Alternative to VSL

Although VICS was the dominant term that emerged from the full set of rankings, we are reluctant to recommend it as a replacement for VSL for two reasons. First, none of the participants in the general population focus groups proposed terms framed as improvements in survival probability, which suggests that it may be less suited to communicating the concept to the general population. Second, "improved chance of survival" has a specific and different meaning in other contexts, including in the medical field when comparing treatments for life-threatening conditions, and in the legal field in the context of medical malpractice. Thus, we are concerned that replacing VSL with VICS could trade one set of confusions for another.

When we remove VICS from consideration, VRMR becomes the dominant term. VRMR is similar to terms suggested by participants in the general population focus groups, such as the "value of mortality risk reduction," which indicates its potential effectiveness in communicating with a broad audience. Moreover, VRMR does not appear to be used as a term-of-art in other fields, thus avoiding confusion among terms. Finally, VRMR is similar to VSL alternatives that are already in use in the economics literature.

Caveats

Our analysis has several caveats. It is based on a small number of subjects (36 total). Some combinations of the building block words remain untested, and the analysis is based on focus group participants' stated preferences for alternative terms rather than a formal

comparison of their revealed comprehension of the alternatives. Furthermore, it does not include the views of media professionals, which would be useful.

CONCLUSIONS

When Schelling (1968) coined the term “value of a statistical life” 50 years ago, he could not have anticipated how often the term would be misunderstood and misconstrued. Ultimately, it will be up to academic and government professionals to replace “VSL” in their publications and presentations with an effective alternative. Based on the feedback we received from members of the general public and non-economist professionals at EPA and our systematic analysis of alternative terms, we propose using the “value of reduced mortality risk.”

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Table 1.

Candidate List of Terms and Aggregated Rankings from Bootstrapped Samples (percentage of samples in which term appears in dominant set)

(1)	(2)	EPA Focus Groups 1– (3)	EPA Focus Groups 1–3 (4)	EPA Focus Groups 1–4 excluding VICS (5)
1	Benefit of micro risk reduction	0	0	0
2	Marginal benefit of mortality risk reduction	0	0	0
3	Marginal value of mortality risk reduction	0	0	0
4	Unit benefit of mortality risk reduction	0	0	0
5	Value of a standard mortality unit	0	0	0
6	Value of a standardized risk unit (for mortality)	0	0	0
7	Value of a statistical life (VSL)	0	0	0
8	Value of decreased mortality risk	0.018	0.03	0.276
9	Value of improved chance of survival (VICS)	0.962	0.825	--
10	Value of micro risk reduction (for mortality)	0	0	0
11	Value of mortality risk change	0	0	0
12	Value of mortality risk reduction	0.008	0.019	0.017
13	Value of reduced mortality risk (VRMR)	0.066	0.246	0.814
14	Value of reduced risk (of mortality)	0.011	0.019	0.122
15	Willingness to pay for decreased mortality risk	0.001	0.001	0.015
16	Willingness to pay for mortality risk reduction	0	0	0
17	Willingness to pay for reduced mortality risk	0.001	0.001	0.015

Notes: Bold cells = terms appearing in dominant set.