

## **Comments from Dr. F. Reed Johnson on the Draft (5-5-16) SAB Review of the EPA's Proposed Methodology for Updating Mortality Risk Valuation Estimates for Policy Analysis**

**June 2, 2016**

### **Executive Summary**

*I read the ES first, then read various sections out of sequence. My comments are annoyingly redundant in several spots, but I didn't take time to go back and fix them.*

*Some of my concerns in the ES actually are dealt with pretty well in the report itself. My reactions might indicate places where the ES is a little too terse.*

**P 6, line 10.** “The SAB was asked to comment on whether the selection criteria for identifying studies for valuing reductions in risks of cancer mortality should differ from those used in the current White Paper. The SAB was also asked whether the literature supports a non-zero differential between valuation of cancer and other mortality risk. Based on **EPA's current study-inclusion criteria available studies**, the SAB concludes that there is not sufficient evidence at this time to justify a non-zero cancer differential. The SAB recommends that, instead of adopting a non-zero cancer differential, the EPA consider using existing methods to value the morbidity that occurs prior to an early death and add that estimated morbidity value to conventional estimates of the value of the associated mortality. The EPA currently values morbidity from cancer in cases where the cancer is not fatal, but does not value morbidity in fatal cancer cases. The EPA should value cancer morbidity regardless of whether that morbidity leads to an early death. This recommendation also applies to other environment-related mortality risks, including cardio-pulmonary disease. In addition, the EPA should encourage and support ongoing research on whether willingness to pay to reduce the risk of an early death preceded by a period of morbidity is correctly valued by summing the value of the morbidity plus the value of the mortality. At this time, the SAB does not have evidence to suggest that approach would over- or under-state the true willingness to pay.”

*This response assumes that morbidity and mortality are separate and additive outcomes. Although linked clinically, there is considerable literature on patients' willingness to accept tradeoffs between quality and quantity of life. People also care how they die. There may not be sufficient evidence in the small number of studies included in the EPA analysis, but that doesn't mean there isn't sufficient evidence in the general health literature.*

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**P 6, line 26.** Income Elasticity Literature

*There were a number of suggestions raised in the discussion, but I'm not sure we reached a consensus on this point.*

**P 6, line 40.** Analysis of Very Low Income Elasticity Estimates

*I believe it was George who advocated leaving all the estimates in, but calculating with and without zeros would handle that.*

**P 7, line 20.** Study Selection Criteria and Alternative Approaches for Estimating Central Income Elasticity of Value of Statistical Life

“Therefore the SAB recommends that the EPA consider the alternative approach of using the preferred VSL model specification to obtain and compare VSL estimates at different points in time and use that to obtain the implied income elasticity of VSL.”

*I believe this was Richard's suggestion, but I didn't sense complete consensus on this point, either. A lot of things change over time and it isn't clear you can isolate income effects without some careful controls for other factors. If it isn't possible to disentangle other effects, it isn't clear this is a superior solution.*

**P 7, line 26.** “The EPA's Technical Memorandum recommends using the income elasticity of VSL to estimate income elasticity for the value of non-fatal health risks. The SAB was asked to comment on whether this represents an appropriate and scientifically sound approach given the available data. The SAB does not **fully** support using the income elasticity of VSL to estimate income elasticity for the value of non-fatal health risks because it is conceptually incorrect to apply income elasticity for one good to some other good.”

*“fully” is too weak.*

**P 7, line 31.** The SAB recommends that the EPA **explore** use of the income elasticity of expenditures on private health care products as a better proxy for the income elasticity of non-fatal health risks.

*Not a great recommendation. How should they “explore”?*

**Section 3.1.3**

**P. 17, line 13.** “The SAB recommends broadening the scope of studies the EPA uses to derive values for reducing both mortality and morbidity risks. There are a significant number of published studies that estimate willingness to pay for improved health and reduced health risks (see studies listed in Appendix B of this report). There also is a burgeoning literature on benefit-

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risk and risk-risk tradeoff preferences in health and health care that could provide a basis for enriching the evidence base on risk preferences and providing support for benefits-transfer applications (see studies listed in Appendix C of this report).”

*As noted, this same point applies elsewhere. Given realistic constraints, there isn't much room for improving estimates if the literature is defined as narrowly as EPA has done for many years. This isn't the only area of applied economics that has an interest in valuing health risks.*

**P 17, line 26.** Other Concerns about the Estimation of Willingness to Pay for Reduced Risk of Immediate Death.

*Good summary of the discussion.*

#### **Section 3.1.4**

**P 18, line 28.** “Therefore, the EPA may need to commission more studies or create other incentives for new studies in order to improve the prospect for a deeper literature to support future reviews of VSL.”

*I would remove this advice everywhere it appears. The report should acknowledge the scarcity of and slow growth in directly relevant studies and just recommend that EPA cast a wider net. I see no realistic option for improving the credibility of health and mortality risk estimates used by the agency.*

#### **Section 3.4.1**

**P 35, line 4.** “Given the importance of VRR, high priority should be assigned to increasing the pool of high quality studies to support the VRR meta-analysis. This is particularly important due to the small number of data sets to support hedonic price estimates, and the relatively small number of stated preference studies currently included in the meta-analysis.”

*As noted, EPA has no resources for doing this and doesn't expect to have any resources for doing this in the foreseeable future.*

**P 35, line 24.** “The EPA could even consider the feasibility of sponsoring its own refereed journal that focuses on analyses of direct relevance to meeting the agency's needs.”

*None of this is going to happen. Al regrets not moving on the journal when he had a chance, but sees no prospect in the future.*

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**P 36, line 37.** ” Information from Other Economic Studies of Risks

The SAB recommends that the EPA consider whether useful information can be extracted from other studies that could improve estimates of VRR and its characteristics (e.g., latency, morbidity).”

*Another source of data is the huge literature on health-care cost-effectiveness analysis. These studies use measures of health-related quality of life that often fall short of utility-theoretic standards, but could nevertheless be useful.*

*There is a comprehensive searchable database of 5000 such studies that is managed by Tufts University. <https://research.tufts-nemc.org/cear4/Default.aspx>*

*The problem could turn out to be too many studies, rather than too few.*

**P 36, line 46.** “EPA might also use the results of ~~a study~~ studies that asked respondents to choose whether to undergo treatment that has a stated risk of morbidity (e.g., paralysis, chronic pain, etc.) versus foregoing treatment, in which case they face a stated mortality risk.”

*See Hauber AB, Fairchild AO, Johnson FR. Quantifying benefit-risk preferences for medical interventions: an overview of a growing empirical literature. Appl Health Econ Health Policy. 2013;Aug;11(4):319-29.*

*I SEE THIS IS CITED IN APPENDIX C. MIGHT WANT TO CALL THIS OUT IN THE REPORT REFERENCES.*

**P 37, line 32.** Open Data Initiatives

*Good recommendation.*

**Section 3.4.2**

**P 40, line 11.** “The SAB has previously concluded that “research suggests that people are willing to pay more for mortality risk reductions that involve cancer than for risk reductions from accidental injury and proposes a placeholder value that could be used for this cancer differential while the Agency pursues long-term research to differentially value other types of risks” (U.S. EPA SAB 2011).”

*EPA is not going to do this. I don't see any point in recommending or assuming they will. The report would be more useful if it focused on ways to enrich the existing studies with studies in related areas.*

**P 40, line 14.** “The motivation behind a potential cancer differential is that a death from cancer is preceded by a significant period of morbidity, while a death from accidental injury may not be.

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According to this motivation, a cancer death can be thought of as two events, a period of morbidity followed by an early death.”

*“period of morbidity” is too simplistic. It isn’t just that people feel sick before dying, but treatment typically is accompanied by surgery, chemotherapy, and radiation that have serious, debilitating side effects. The experience of the final death also is traumatic for family and friends as well as the affected individual in ways that sudden accidental death is not.*

**P 41, line 10.** “Based on available studies, the SAB concludes that there is not sufficient evidence at this time to justify a non-zero cancer differential.”

*This is not the appropriate conclusion. SAB can conclude that the evidence that EPA has looked at does not justify a non-zero differential, but these studies simply were not adequately designed or powered to detect such a differential. The health-preference literature clearly shows that people care how they die.*

**P. 41, line 13.** “The SAB recommends that, instead of adopting a nonzero cancer differential, the EPA consider using existing methods to value the morbidity that occurs prior to an early death, and add that estimated morbidity value to conventional estimates of the value of the associated mortality. “

*This is just inadequate.*

**P. 41, line 22.** “The EPA should encourage and support ongoing research on whether willingness to pay to reduce the risk of an early death preceded by a period of morbidity is correctly valued by summing the value of the morbidity plus the value of the mortality.”

*It is pointless to keep recommending this.*

**P 41, line 25.** “Gray literature studies, studies conducted outside the United States, and studies that do not directly estimate VSL, such as risk-risk tradeoff studies and risk-benefit studies, could be assessed to determine whether there is evidence that the VSL for different mortality risks differs, after having controlled for the value of associated morbidity. <<Chair’s note: can we provide citations to relevant studies?>>”

*See references provided above.*

### **Section 3.5.1**

**P 42, line 26.** “One area to explore further, in the absence of explicit studies, is the possibility of using estimates of the income elasticity for other related goods and services to infer estimates of

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the income elasticity of VSL. <<Chair's note: it would be helpful to provide some examples and citations to clarify what types of goods and services>> “

*See comment on the ES.*

### **Section 3.5.2**

**P 43, line 2.** “Analysis of Very Low Income Elasticity Estimates”

*See comment on the ES.*

### **Section 3.5.3**

**P 45, line 25.** “Methodologies for Estimating Income Elasticity of VSL”

*I reacted negatively to the section in the ES on this. This discussion is much more nuanced. It might help if a little more of the complexity carried over into the ES.*

### **APPENDIX B**

**P B-1.** APPENDIX B Bibliography on Willingness to Pay in Health and Health Care [partial]

*Plus 5,000 health and health-care cost-effectiveness studies!*

### **Typos and Editorial Corrections**

**P 6, line 44.** “The SAB was asked to comment on: (1) whether this was an appropriate and scientifically sound choice, and (2) how very low, non-zero, mean reported income elasticity results should be addressed in the EPA’s analysis.”

P 36, line 42. “For example, EPA might consider using **the** results of a risk-risk **study** studies that employed a stated-preference approach, wherein respondents were asked to choose whether to undergo treatment (e.g., a risky surgery) that has a stated risk of immediate mortality versus a given risk of cancer, which involves stated risks of both long term morbidity and subsequent mortality