MEMORANDUM TO: SECRETARIAL OFFICERS   [SIGNED July 29, 2011]
                  MODAL ADMINISTRATORS

From: Polly Trottenberg, Assistant Secretary for Transportation Policy
                  x64540

                  Robert Rivkin, General Counsel
                  x64702

Re: Treatment of the Economic Value of a Statistical Life in
                  Departmental Analyses – 2011 Interim Adjustment

---

Departmental guidance on valuing reduction of fatalities and injuries by regulations or investments was first published in the 1993 memorandum "Treatment of Value of Life and Injuries in Preparing Economic Evaluations." This guidance was revised in 2008 on the basis of later research, yielding a value of statistical life (VSL) of $5.8 million. The last time our guidance was adjusted was in 2009, when we announced the current value of $6.0 million. Using the 2009 value as the baseline, we now find that changes in prices and incomes over the last two years imply an increased VSL of $6.2 million for analyses prepared in 2011.

However, since our last formal examination of the professional literature about VSL occurred three years ago, we have decided to conduct a further review, so that we can ensure the value used by Department analysts reflects the best and most recent academic research. While analysts should, for now, base analyses on a VSL of $6.2 million, we may further revise that guidance after completion of the review.

Note also that we are adopting three changes in methodology in addition to the current interim VSL adjustment. First, although we have previously updated VSL estimates to current values by using an income elasticity of 0.55, we will now forecast higher future VSL in response to expected income growth. Second, consistently with the increasing VSL so derived, we replace standard deviations specified in dollars with ones defined in proportion to the value of benefits. Third, we update the relative values of injuries of varying severity on the basis of a recent study.

This guidance and other relevant documents will be posted on the Reports page of the Office of Transportation Policy website, http://ostpxweb.dot.gov/policy and on the General Counsel's Regulatory Information Website, http://regs.dot.gov. Questions should be addressed to Peter Belenky, (202) 366-5421 or peter.belenky@dot.gov.

cc: Regulations officers and liaison officers

Revised Departmental Guidance:

Treatment of the Value of Preventing Fatalities and Injuries in Preparing Economic Analyses – 2011 Revision

The 1993 guidance memorandum "Treatment of Value of Life and Injuries in Preparing Economic Evaluations" established recommended values to be used in regulatory and investment analyses by all administrations within the U.S. Department of Transportation. Revised guidance published in 2008 and based on more recent research yielded a value of statistical life (VSL) of $5.8 million, which was adjusted to $6.0 million in 2009 in response to growth in the consumer price index and the employment cost index. No revision was published in 2010, but the value would have remained unchanged. In this revision, we find that changes in prices and incomes over the last two years imply that the VSL to be used in analyses prepared in 2011 should now be increased to $6.2 million.[1]

In the revised guidance published on February 5, 2008, we adopted an income elasticity of 0.55 for adjusting past VSL to current values, but we did not use it to estimate anticipated VSL resulting from expected growth in real income levels. Since higher incomes should be reflected in willingness to pay for reduced risk, logical consistency requires that this income adjustment be incorporated in estimates of future as well as past and present VSL. EPA has also adopted this principle in its analyses.[2]

The procedure we now recommend uses the Congressional Budget Office's estimate of the long-term annual growth rate of labor productivity, 1.6 percent, to project future real income levels. Analysts should augment the base-year VSL by 0.877 percent per year to estimate VSL of any future year in base-year dollars before discounting to present value.[3]

This growth rate should be used as a single value, although it, too, can be estimated only approximately. While EPA uses a slightly different elasticity estimate as the central value and has assumed high and low figures for development of alternative projections, that procedure is unduly cumbersome for our purposes. Instead, we will adopt a single measure of variation to reflect uncertainty in the benefit of reducing present and future risks of fatalities and injuries.

As noted in our previous guidance, the values of preventing injuries of varying severity prescribed in 1993 have been under review. Recent research provides a basis for updating

---

[1]
$$VSL_{2011} = VSL_{2008} * (CPI_{2010}/CPI_{2007}) * (ECI_{2010}/ECI_{2007}) \wedge 0.55$$

$$6.1508 = 5.8008 * (218.056/207.342) * (101.275/99.775) \wedge 0.55$$

[2] Environmental Protection Agency "Guidelines for Preparing Economic Analyses." p. B-5.
http://yosemite.epa.gov/ee/epa/eed.nsf/webpages/Guidelines.html#download
"The Benefits and Costs of the Clean Air Act 1990 to 2010: EPA Report to Congress," p. H-39
http://yosemite.epa.gov/ee/epa/eerm.nsf/vwRepNumLookup/EE-0295A?OpenDocument

[3] $1.016\wedge0.55 = 1.00877$ (annual income growth factor of 1.016, raised to the power of the income elasticity, 0.55, yields annual VSL growth factor of 1.00877.)

these values.[4] Unlike the VSL estimate itself, the benefits of preventing injuries are not derived from estimates of public willingness to pay to reduce risk. Empirical research can not yield a credible and specific value of guarding against every potential injury. Instead, each type of injury experienced in transportation accidents is rated (in terms of severity and duration) on a scale of quality-adjusted life years (QALYs), which compares it to the alternative of perfect health. These scores are grouped, according to the Abbreviated Injury Scale (AIS), yielding coefficients that can be applied to VSL to assign each injury class a value corresponding to a fraction of a fatality.

The measure adopted here is the quality-adjusted percentage of remaining life lost for median utility weights, based on QALY research considered "best" as presented in Table 9 of the cited study by Spicer and Miller. The rate at which disability is discounted over a victim's lifespan causes these percentages to vary slightly, and the study shows estimates for 0, 3, 4, 7, and 10 percent discount rates. These differences are minor in comparison with other sources of variation and uncertainty, which we recognize by sensitivity analysis. Since OMB recommends the use of alternative discount rates of 3 and 7 percent, we present the scale corresponding to an intermediate rate of 4 percent for use in all analyses. The fractions shown should be multiplied by the current VSL to obtain the values of preventing injuries of the types affected by the government action being analyzed.

Relative Disutility Factors by Injury Severity Level (AIS)

For Use with 3% or 7% Discount Rate

AIS Level	Severity	Fraction of VSL
AIS 1	Minor	0.003
AIS 2	Moderate	0.047
AIS 3	Serious	0.105
AIS 4	Severe	0.266
AIS 5	Critical	0.593
AIS 6	Unsurvivable	1.000

---

[4] Rebecca S. Spicer and Ted R. Miller. "Final Report to the National Highway Traffic Safety Administration: Uncertainty Analysis of Quality Adjusted Life Years Lost." Pacific Institute for Research and Evaluation. February 5, 2010.
http://ostpxweb.dot.gov/policy/reports/QALY Injury Revision_PDF Final Report 02-05-10.pdf

In accord with OMB Circular A-4 and Departmental policy, the range of uncertainty in benefits and costs must be estimated to inform officials and the public of the confidence they should place in the effects of decisions. We therefore require benefit-cost analyses to include estimates based on plausibly higher and lower values. Particularly where, in addition to the uncertainty of VSL, the frequency or severity of accidents and the costs of regulatory options are uncertain, we recommend that a joint probability distribution of potential outcomes be estimated by Monte Carlo analysis. Since we are no longer specifying a constant VSL but adopting one expected to grow over time, we recommend that the ratio of the standard deviation of $2.6 million to the VSL of $5.8 million adopted in 2008, or 45 percent of the estimated values of preventing fatalities and injuries, be assumed as the standard deviation of those benefits. A probability distribution function limited to non-negative values (such as the lognormal distribution) should be employed.

If VSL is the only uncertain parameter or if the economic significance of the rule is small, discrete alternative calculations using the specified VSL, plus or minus one standard deviation, may be presented to suggest whether different conclusions lie within a reasonable range. When more than one variable is estimated with uncertainty, an example of the most beneficial outcome should be developed by using estimates for all values yielding a high estimate of benefits, together with a low estimate of costs. Conversely, the least beneficial outcome may be represented by combining estimates associated with low benefits and high costs.

It is not possible to derive statements about the probability of outcomes from combinations of discrete, high or low estimates of some variables with probability distributions of others. For example, one may not say that a specific VSL estimate, combined with a probability distribution of the fatalities prevented, yields an estimate of the probability of any range of benefits. Use of discrete alternative values implies that only suggestive examples may be obtained, while conclusions about the probability of outcomes must be developed from a joint probability distribution based on the estimated or hypothesized distributions of all input values.

This guidance and other relevant documents will be posted on the Reports page of the Office of Transportation Policy website, http://ostpxweb.dot.gov/policy. Questions should be addressed to Peter Belenky, (202) 366-5421 or peter.belenky@dot.gov.