Valuing Risks to Life: Ethical Issues and Policy Challenges

W. Kip Viscusi

University Distinguished Professor

Vanderbilt Law School

kip.viscusi@vanderbilt.edu

June 20, 2012

Government-University-Industry Research Roundtable

Washington, D. C.

Sponsored by the National Academy of Science, the National Academy of Engineering, and the Institute of Medicine.

What's a Life Worth?

- Why do we value lives?
- How do we value lives?
- How do these values differ and should these differences count?
- What controversies have arisen and how should they be resolved?

The Necessity of Tradeoffs

- Economic limits
  - 128,000 accidental deaths per year
  - GDP/Accidental death = $115 million/death
  - Also 33 million disabling injuries .

Thought Experiment

How much are you willing to pay to eliminate one time only risk of death of 1/10,000?

Amount in Dollars

Infinite

Above 1,000

500 – 1,000

200 – 500

50 – 200

0 – 50

Thought Experiment

How much are you willing to pay to eliminate one time only risk of death of 1/10,000?

Amount in Dollars	Value of Statistical Life ($)
Infinite	Infinite
Above 1,000	Above 10,000,000
500 – 1,000	5,000,000 – 10,000,000
200 – 500	2,000,000 – 5,000,000
50 – 200	500,000 – 2,000,000
0 – 50	0 – 500,000

Calculating the Value of Statistical Life

- Suppose 1/10,000 risk to 10,000 people so 1 expected death
- Assume each would pay $900 to eliminate the risk
- Value of Statistical Life = 10,000 people x $900/person = $9,000,000

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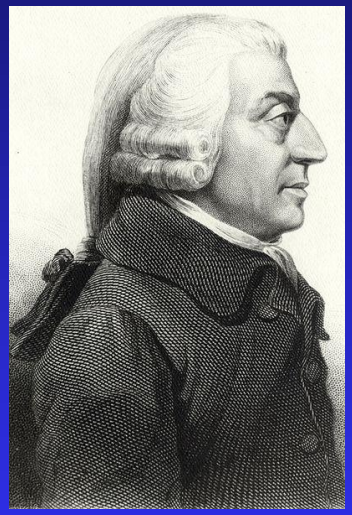
What Value of Statistical Life (VSL) Means

- VSL only gives rate of tradeoff for small risks
- VSL understates amount of compensation needed to incur risk of certain death
- VSL overstates amount willing to pay to avoid certain death
- VSL is used to value small risk reductions by government programs .

Dominant Approach: Wage-Risk Tradeoffs

- Adam Smith's theory of compensating wage differentials



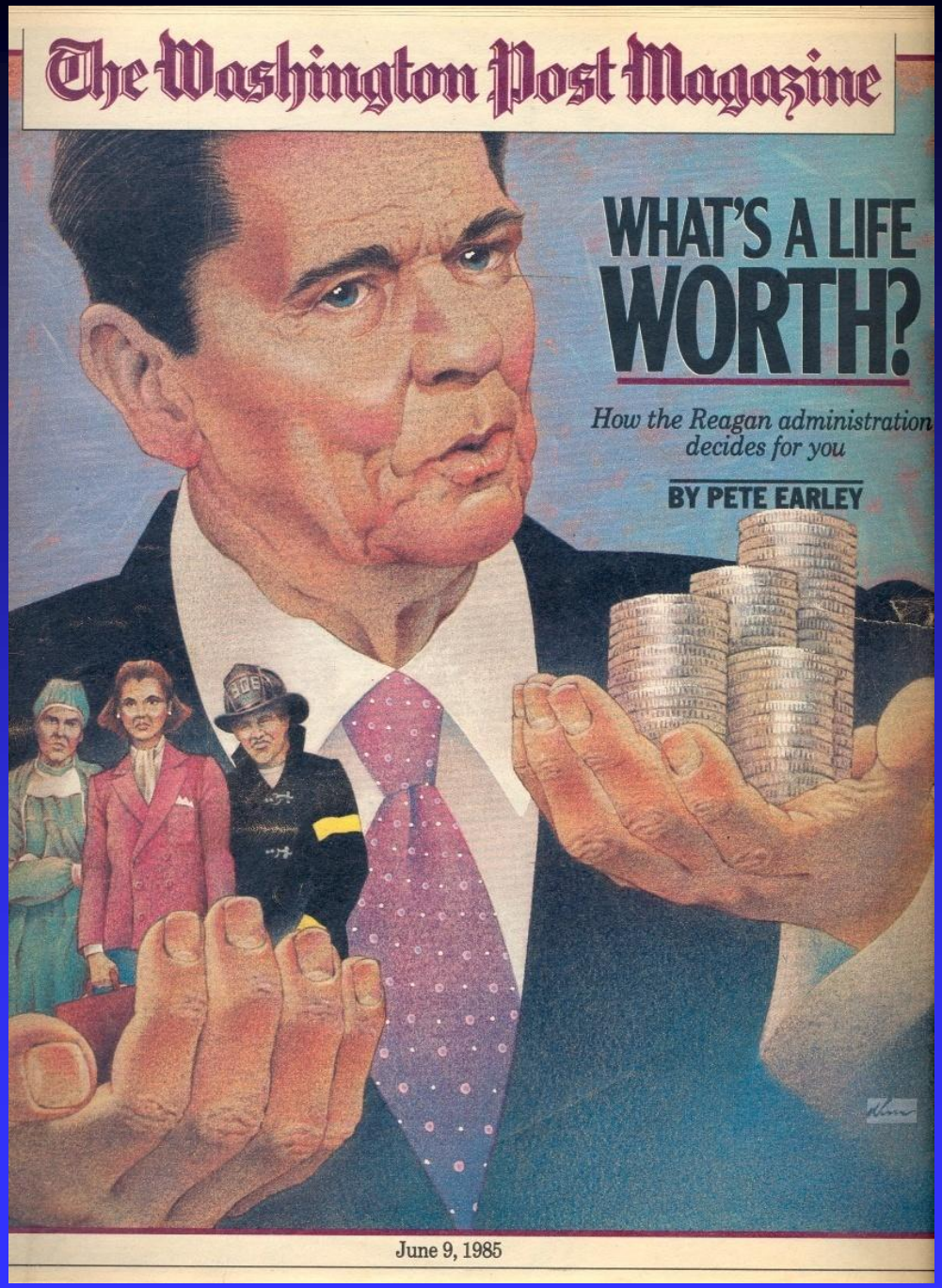
- Controlling for other aspects of the job, how much pay for extra risk?

The Average Value of Statistical Life

- Median U.S. value is about $9 million ($2011) based on meta analysis in Viscusi and Aldy (2003) and estimates in Kniesner et al. (2012).
- Require $900 to face risk of 1/10,000
- Foreign countries often have VSL estimates in expected range, e.g., India is lower. .

History of Thinking About Value of Life for Policy

- Early studies – present value of lost earnings
  - Easy to calculate
  - Used in court cases
- Benefits principle for all policies – society's willingness to pay for the benefit
- Benefit is risk reduction – risk/money tradeoff
- Good economics, but viewed as "immoral" .


The Washington Post Magazine
WHAT'S A LIFE WORTH?
How the Reagan administration decides for you
BY PETE EARLEY
June 9, 1985

Valuing Lives for Policy

- 1982 hazard communication debate
- Life is too sacred to value so OSHA calculated "cost of death" as present value of lost earnings
- OMB: Benefits did not exceed costs so rejected regulatory proposal
- OSHA appealed to V-P Bush
- I analyzed merits of proposal using proper value of statistical life (VSL) estimates – 10 times the present value of lost earnings .

Evidence to Settle the Debate

- My estimates used in 1982 were just over $3 million
- Benefits now exceeded costs, and regulation was issued
- Some attacked as too big – people anchored on present value of lost earnings
- Historical context is that VSL was more supportive of risk regulation than failing to quantify by making reduced risks "priceless"

Saving Individual Lives

- Examples of lives to be saved
  - Girl in a well
  - Trapped coal miner
  - Beached whales

- Identified lives not statistical lives .

Possible Variations in VSL

- Income
- Age
- Immigrants

Should Income Levels Matter?

- Yes for lost earnings approach
- Willingness to pay increases with income
- Provide policies poor don't value?
- Airline safety – should we regulate it more stringently than highway safety?
  - Planes versus guardrails .

Income Levels and Government Practice

- DOT adopted Viscusi-Aldy (2003) income elasticity estimate of 0.55.
- Rationale is stronger if beneficiaries of safety regulation pay for higher costs of safety.

Are Older People's Lives Worth Less?

- Shorter remaining life, often worse health
- No theoretical basis or link to preferences of affected population
- Correct approach – how does willingness to pay for risk reduction vary with age?

The “Senior Discount” Controversy

- EPA used a senior discount of 37% in analysis of Clear Skies initiative
- Political firestorm

Seniors on sale

37% off

Are Age Differences Fair?

- Is same value per statistical life equitable?

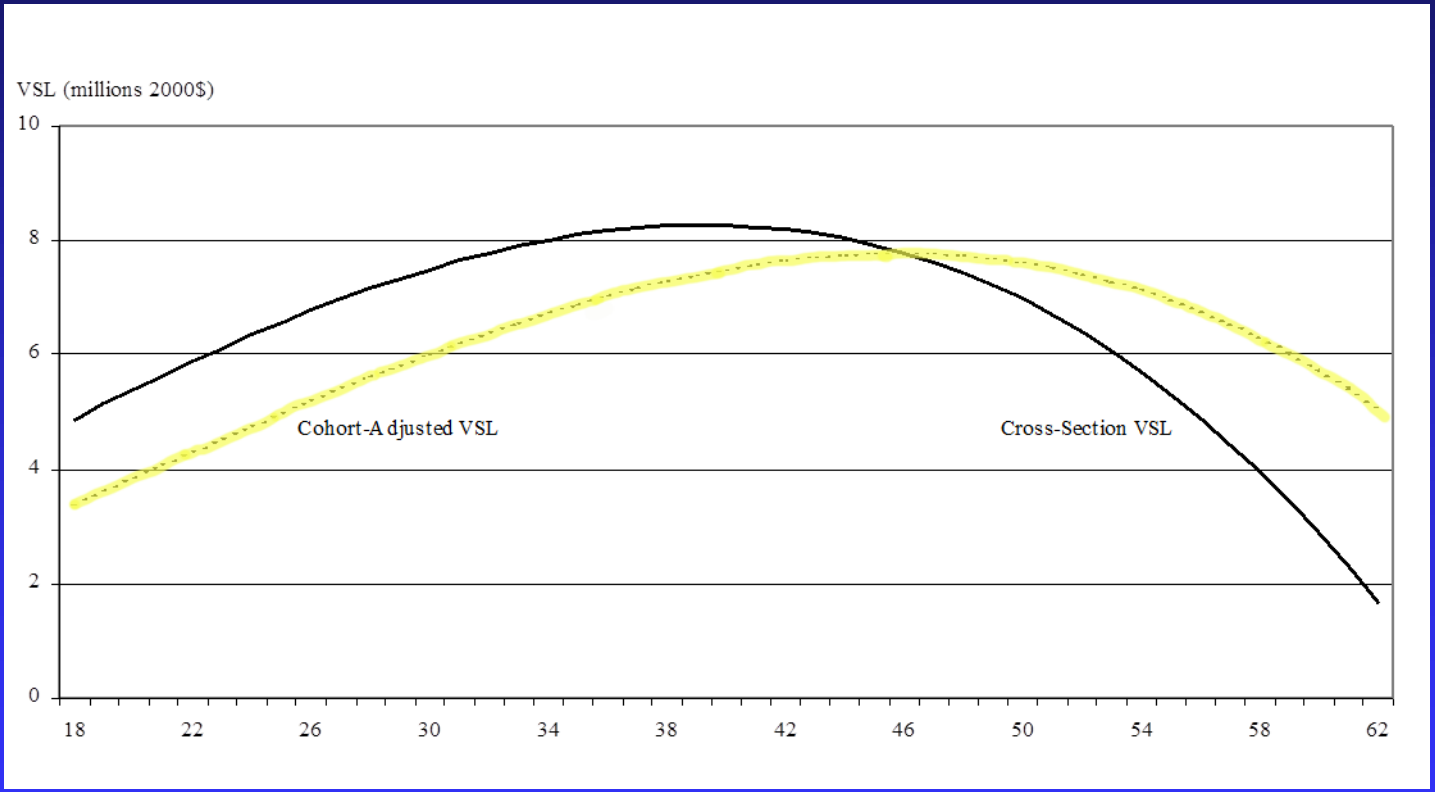
  versus

- Is same value per statistical life year equitable?
  - Return to first principles – willingness to pay

Age and the Labor Market

- Series of studies over two decades
- Most recent use age-specific risk data
- Result is inverted-U shape pattern
- Flatter if control for consumption over the life cycle or cohort effects
- VSL tracks lifetime income and consumption.

Cohort-Adjusted and Cross-Section Value of Statistical Life, 1993-2000



What Do We Know About Age-VSL?

- VSL does not peak at birth
- VSL does not plummet as we age
- VSL for workers around age 60 is higher than for workers age 20
- Use of VSL by age may not be controversial if done correctly .

Segmented Labor Markets

- Workers may face different labor market offer curves.
- Settle into separate labor market equilibria (Viscusi and Hersch 2001).
- Test: If workers face greater risk levels but receive less total wage compensation for risk, then cannot be on same market offer curve.

Examples of Separate Labor Market Offer Curves

- Smokers and Nonsmokers (Viscusi and Hersch 2001)
- Black-white VSL differences (Viscusi 2003)
- Mexican immigrants versus other immigrants or native Americans (Hersch and Viscusi 2010)

VSL and Immigrant Status

	Fatality Risk*	VSL
Estimates Based on the CPS		
Native U.S.	4.35	7.95
Mexican immigrants	5.97	Not significant
Estimates Based on the NIS		
All immigrants	4.50	9.35
Mexican immigrants	5.70	Not significant
Mexican immigrants who speak English	5.70	3.44

*Fatality rate by industry-immigrant status-age. Risk is annual fatality rate per 100,000 workers.

2008 Devaluation of Life

- EPA Air Office lowered the VSL from $8 million to $7 million.
- Economic puzzle since income levels have risen over time so expect rising VSL.
- Based on differing results of 2 meta analyses (Viscusi and Aldy vs. Mrozek and Taylor) .

2008 Devaluation of Life, cont'd

- Political firestorm – Bush conspiracy?
- But all EPA VSL numbers still exceeded those used by other agencies. Change and direction of change matter.
- Proposed legislation in 2008 whereby EPA must only raise VSL and differences in VSL are prohibited.

Conclusions

- Age, income, and other influences on value of statistical life remain controversial
- Much of the controversy is due to misunderstanding of "economic" value
- Benefits are grounded in society's willingness to pay
- Monetizing benefits makes them matter
- Treating some benefits as "priceless" may make them "worthless" .