2004

Are Poor People Worth Less Than Rich People? Disaggregating the Value of Statistical Lives

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The University of Chicago Law School
John M. Olin Law & Economics Working Paper Series
Working Paper No. 207

AEI-Brookings Joint Center for Regulatory Studies
Working Paper No. 04-05

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February 2004

Preliminary draft 2/17/04

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Abstract

Each government agency uses a uniform figure to measure the value of a statistical life. This is a serious mistake. The very theory that underlies current practice calls for far more individuation of the relevant values. According to that theory, the value of statistical lives should vary across risks. More controversially, the value of a statistical life should vary across individuals—even or especially if the result would be to produce a lower number for some people than for others. One practical implication is that a higher value should be given to programs that reduce cancer risks. Should government use a higher VSL for programs that disproportionately benefit the wealthy—and a lower VSL for programs that disproportionately benefit the poor? A serious complication here is that sometimes the beneficiaries of regulation pay only a fraction or even none of its cost; when this is so, the appropriate VSL for poor people might be higher, on distributional grounds, than market evidence suggests. An understanding of this point has implications for foundational issues about government regulation, including valuation of persons in poor and wealthy nations.

I. Introduction

For over two decades, executive orders have required regulatory agencies to engage in cost-benefit analysis of major regulations,[1] and Congress has imposed the same requirement in several statutes.[2] To conduct cost-benefit analysis, agencies must assign monetary values to human lives. What numbers do they choose? Do some deaths count for more than others?

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[1] See Stephen Breyer et al., Administrative Law and Regulatory Policy 120-35 (5th ed. 2002).

[2] See, e.g., 15 USC 2601 et seq. (Toxic Substances Control Act); 7 USC 136 et seq. (Federal Insecticide, Fungicide, and Rodenticide Act); 42 USC 300g-1 (Safe Drinking Water Act).

The Environmental Protection Agency uses a uniform value for a statistical life (VSL): $6.1million.[3] Other agencies use either lower and higher numbers, with a range, in recent years, between $1.5 million (the Federal Aviation Administration in 1990[4]) to the FDA's current figure of $6.5 million.[5] While substantial differences can be found across agencies,[6] uniformity is the intended practice within agencies.[7] No agency treats cancer risks, or mortality risks that produce unusual fear or involve special suffering, as worthy of more concern than other risks. No agency treats young people as worth more than poor people.[8] No agency values the lives of poor people less than the lives of rich

[3] See 66 Fed. Reg. at 7012. In its July 2003 regulation governing food labeling of trans fatty acids, the Food and Drug Administration used a VSL of $6.5 million, see 68 Fed. Reg. 41434, 41488 (July 11, 2003); in its March 13, 2003 proposed rule on dietary ingredients and dietary supplements, the same agency suggested a VSL of $5 million, see 68 Fed. Reg. 12158, 12229 (using this value to calculate the "value of a statistical life day").

[4] The Department of Transportation now uses a higher figure, but one that is still low in comparison to what most agencies do. See 67 Fed. Reg. 17556, 17559 (April 10, 2002) ($2.7 million).

[5] See Table 1 below; Matthew Adler and Eric A. Posner, Implementing Cost-Benefit Analysis When Preferences Are Distorted, 29 J Legal Stud 146 (2000).

[6] These differences appear to be inexplicable.

[7] See Adler and Posner, supra note. There are some differences within agencies across contexts and across time, but those differences do not appear to be deliberate. See, e.g., the FDA sources cited in note 1 supra. The most explicit discussions of varying VSL have come from the EPA. In its 2003 discussion of hazardous air pollutants, see 68 Fed. Reg. 1660, 1693 (Jan. 13, 2003), the EPA noted that there "is general agreement that the value to an individual of a reduction is mortality risk can vary based on several factors, including the age of the individual, the type of risk, the level of control the individual has over the risk, the individual's attitude toward risk, and the health status of the individual." Nonetheless, the agency announced, without offering reasons, that it "prefers not to draw distinctions in the monetary value assigned to the lives saved even if they differ in age, health status, socioeconomic status, gender or other characteristic of the adult population." Id.

An extended discussion of related issues can be found in the EPA's arsenic proposal, see 65 Fed. Reg. 38888, 38945 (June 22, 2000). There the EPA noted that the "factors which may influence the estimate of economic benefits associated with avoided cancer fatalities include (1) a possible 'cancer premium' (i.e., the additional value or sum that people may be willing to pay to avoid the experiences of dread, pain and suffering, and diminished quality of life associated with cancer-related illness and ultimate fatality); (2) the willingness of people to pay more over time to avoid mortality risk as their income rises; (3) a possible premium for accepting involuntary risks as opposed to voluntary [sic] assumed risks; (4) the greater risk aversion of the general population as opposed to workers in the wage-risk valuation studies; (5) 'altruism' or the willingness of people to pay more to reduce risk in other sectors of the population and (6) a consideration of health status and life years remaining at the time of premature mortality." The EPA acknowledged that these factors "may significantly increase the present value estimate," but said that "there is currently neither a clear consensus among economists about how to simultaneously analyze each of these adjustments nor is there adequate empirical data to support quantitative estimates for all potentially significant adjustment factors." Id. Hence the EPA solicited comments on these issues and said that it would ask its Scientific Advisory Board (SAB) to conduct a review. Id. As noted below, the comments produced a sensitivity analysis that contains several 7% upward adjustments from the $6.1 million figure, see below, but the SAB's review suggested that at the present time, upward adjustments were not justified by existing evidence, see below.

[8] With the interest in focusing on "life-years," however, this might change. See Cass R. Sunstein, Lives, Life-Years, and Willingness to Pay, Colum L Rev (forthcoming 2004).

people. No agency distinguishes between whites and African-Americans or between men and women. For statistical lives, the governing idea is that each life is worth exactly the same. With respect to cost-benefit analysis, much is disputed.[9] But on the idea of a uniform value per life saved, there is a solid consensus, at least in terms of regulatory practice.[10]

I intend to question that consensus here, and to do so in a way that raises foundational issues about the economic valuation of human lives. I suggest that a uniform value is obtuse. Under the very approach that agencies use to produce the current numbers, the value of a statistical life should vary along two dimensions. First, it should vary across risks. For example, there is reason to think that VSL is higher for cancer deaths than for sudden, unanticipated deaths[11]; deaths that produce unusual fear,[12] or that are accompanied by high levels of pain and suffering, should be expected to produce a higher VSL. Human beings face countless mortality risks, and it would be truly bizarre to maintain that for each of these risks, VSL is identical. Second, VSL should vary across individuals.[13] People who are risk averse will show a higher VSL than people who are risk-seeking.[14] People who are thirty will show a higher VSL than people who are sixty.[15]

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[9] For various perspectives, see Adler and Posner, supra note; W. Kip Viscusi, Fatal Tradeoffs (1994); Frank Ackerman and Lisa Heinzerling, Priceless (2004).

[10] An arguable exception, noted below, involves the debate over whether agencies should focus on lives or instead life-years; the latter approach might well value older people less than younger ones. For discussion, see Cass R. Sunstein, Lives, Life-Years, and Willingness to Pay, Colum L Rev (forthcoming 2004). An implicit challenge to the consensus can be found in W. Kip Viscusi, Risk Equity, J Legal Stud. W. Kip Viscusi and Joseph E. Aldy, The Value of a Statistical Life: A Critical Review of Market Estimates Throughout the World, 27 J Risk and Uncertainty 5, 7 (2003), notes the existence of heterogeneity by income, union status, and age, and explains that the "existence of such heterogeneity provides a cautionary note for policy."

[11] See James K. Hammitt and Jin-Tau Liu, Effects of Disease Type and Latency on the Value of Mortality Risk, 28 J Risk and Uncertainty 73 (2004) (finding that willingness to pay to reduce a cancer death is about one-third larger WTP to reduce risk of a similar chronic, degenerative disease).

[12] For evidence of a higher VSL for airline risks than for automotive risks, see Fredrik Carlsson et al., Is Transport Safety More Valuable in the Air?, 28 J Risk and Uncertainty 147 (2004).

[13] See Viscusi and Aldy, supra note, at 18 ("transferring the estimates of a value of a statistical life to non-labor market contexts, as is the case in benefit-cost analyses of environmental health policies for example, should recognize that different populations have different preferences over risks and different values on life-saving").

[14] See Carlsson et al., supra note, at 158 (finding that those who are scared of flying are willing to pay especially high amounts to reduce the risks of flying).

[15] As found in Joseph P. Aldy and W. Kip Viscusi, Age Variations in Workers' Value of a Statistical Life (2003), forthcoming.

Those who are rich will show a higher VSL than those who are poor. It follows that different demographic groups will show diversity in their VSL as well.[16]

If we put together these two forms of variability—across risks and across persons—we will find that the unitary $6.1 million figure is far too crude. In theory, each person in society should have a particular VSL for each and every risk, resulting in a fully individuated VSL.[17] Such a fully individuated VSL would mean, for example, that the VSL of some racial groups would likely be lower than that for others.[18] But these differences would not be the result of a governmental decision to take racial characteristics into account; in fact it would not be a product of any kind of group-level discrimination on government's part, at least not when government is calculating VSL.[19] The differences would be the result of aggregating fully individual VSLs, just as ordinary markets do in producing prices for the reduction of the statistical risks associated with smoke alarms, unusually safe cars, and much more.[20]

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[16] Such differences are found in W. Kip Viscusi, Racial Differences in Labor Market Values of a Statistical Life, 27 J. Risk & Uncertainty 239, 252 tbl.5 (2003) [hereinafter Viscusi, Racial Differences]. To get a bit ahead of the story: I am not arguing that government should assign a higher VSL to white lives than to African-American lives. I am speaking here of demographic differences that would emerge from a fully individuated approach to VSL, in which each person's WTP were calculated on an individual basis; once these values are aggregated, the white VSL would likely be higher than the African-American VSL, simply because of disparities in wealth and income. Richer people pay more for safe cars and smoke alarms than poor people do. See below for further discussion.

[17] I am putting to one side the complication that sometimes values are constructed, rather than elicited, by social situations – an especially serious complication for contingent valuation studies. See John Payne et al., Measuring Constructed Preferences: Toward a Building Code, 19 J. Risk and Uncertainty 243 (1999); Cass R. Sunstein and Richard Thaler, Libertarian Paternalism Is Not An Oxymoron, 70 U Chi L Rev 1159, 1177-1178 (2003).

[18] As found in W. Kip Viscusi, Racial Differences in Labor Market Values of a Statistical Life, 27 J Risk and Uncertainty 239 (2003); John D. Leeth and John Ruser, Compensating Wage Differentials for Fatal and Nonfatal Injury Risk by Gender and Race, 27 J Risk and Uncertainty 257 (2003). Viscusi finds that the overall white VSL is $15 million, while the overall African-American VSL is $7.2 million. For white females, the overall VSL is $9.4 million, compared to $18.8 million for white males; for African-American females, the overall VSL is $6.9 million, compared to $5.9 million for African-American males.

[19] Discrimination might well lay in the background, of course; it almost certainly accounts for the unequal opportunities that produce lower VSL for African-Americans than for whites. See Viscusi, supra note, at 255, for the suggestion that the racial differentials reflect "differences in market opportunities." Viscusi goes on to suggest that "it is inappropriate to attribute the observed differences to a greater willingness by black workers to bear risk." Id. In a sense Viscusi is correct; there is no reason to think that African-American workers have an intrinsically greater predisposition to take risks. But in the market, one's willingness to bear risks is a product of "market opportunities," and hence those with fewer opportunities will show a greater willingness to bear risk.

[20] See W. Kip Viscusi, Fatal Tradeoffs (1994).

In practice, of course, a fully individuated VSL is not feasible, for two different reasons. First, government lacks the information that would permit the calculation. Regulators do not know how much each person would be willing to pay to reduce each statistical risk; categories are therefore inevitable. Second, many regulatory programs involve collective goods and therefore must protect many people at once. A clean air program, for example, cannot easily ensure that some people in a geographical region are exposed to no more than 10 parts per billion (ppb) of some pollutant, while others in the same region are subjected to 50 ppb. Because collective goods are typically involved in regulation, the problem is pervasive.

Notwithstanding issues of feasibility, an understanding of the reasons for individuating VSL is important for two reasons. The first involves conceptual clarity. The theory behind the use of VSL and willingness to pay (WTP) remains poorly understood. An appreciation of the case for individuation will clarify the theory—both its rationale and its limitations, empirical and ethical. The second reason involves the possibility of moving some way in the direction of greater individuation. With respect to cancer risks, for example, there is reason to believe that VSL is significantly higher than the amounts produced by examining studies of workplace accidents. For this reason, the government's current numbers for cancer risks might well be too low, resulting in widespread underprotection of the public. Similarly, there is reason to think that VSL should be higher for mortality risks from airplanes than for statistically identical risks on the highways.[21] More generally, different agencies, dealing with qualitatively different risks, might well use different VSLs, simply because market evidence is likely to show just those differences. Full individuation is not feasible, but greater individuation would be quite easy.

A far more troublesome point, to which I will devote considerable attention, involves disparities along demographic lines. For now, notice a simple factual point: When risks are faced disproportionately by wealthy people, VSL, based on actual WTP, should be higher than $6.1 million—just as it should be lower when it is faced

[21] See Carlsson, supra note (finding that people's WTP for airline deaths is more than double their WTP for taxi deaths).

disproportionately by poor people.[22] WTP is dependent on ability to pay, and those with little income and wealth will show little WTP. It follows that people in poor nations will have a lower VSL than people in rich nations, a point with implications for valuation of the harms from global warming[23]—and that people in poor areas will have a lower VSL than those in wealthy areas, a point with implications for valuation of multiple risks in the domestic setting. If variations across risks and persons are significant, the question of individuation should be a central part of the second generation of cost-benefit analysis—a step beyond the first generation debate about whether to do such analysis at all, and a step toward doing such analysis in a way that is more refined and more closely attuned to the consequences of regulations in terms of both welfare and distributional equity.

Of course it is offensive and wrong to suggest that in principle, poor people are "worth less" than rich people. If poor people are subject to a risk of 1/10,000, they do not have less of a claim to public attention than if wealthy people are subject to the same risk; in fact they have a greater claim, if only because they lack the resources to reduce that risk on their own. But the topic here is regulation rather than subsidy, and the two ought not to be confused. In principle, government should not force people to buy protection against statistical risks at a price that seems to them excessive.[24] Someone should not be required to pay $70 to reduce a risk of 1/100,000 if she is willing to pay no more than $50. The point bears on international issues as well as domestic ones. If a uniform VSL would benefit the poor, there is an argument for a uniform VSL. But regulation based on a uniform VSL may or may not produce a better distribution of income; in fact any redistribution may be perverse, and a single VSL might not promote equality at all. If wealthy people are the principal beneficiaries of a particular regulation chosen on the basis of a uniform VSL, and if the public as a whole pays for it, then any redistribution will benefit the wealthy, not the poor. And if poor people are forced to pay an amount for risk reduction that exceeds their WTP, desirable redistribution will hardly result; forced exchanges, on terms that people reject, are not a good way of redistributing wealth to the disadvantaged. On the other hand, it is possible that some regulatory programs, based on

[22] With this qualification: If poor people would be disproportionately benefited by assigning them a higher VSL, then there is a good argument for assigning them a higher VSL. I explore this issue below.
[23] See below.
[24] I offer a number of qualifications below. See TAN infra.

a uniform VSL, will help those in need, if their beneficiaries receive risk reduction for which they pay little or nothing—an issue to which I will devote considerable attention.

A larger lesson follows. For purposes of law and politics, there is no sensible answer to the abstract question about the correct monetary value of human life. Any judgment about the appropriate VSL, and about individuation, must be heavily pragmatic; it must rest on the consequences of one or another choice. Whether government should use a higher or lower VSL across demographic lines cannot be answered simply. An important implication involves the assessment of VSL across nations. A poor nation would do well to adopt a lower VSL than a wealthy nation; for China or India, it would be disastrous to use a VSL equivalent to that of the United States or Canada. But this point should not be taken to support the ludicrous proposition that for donor institutions, both public and private, risk reduction in a wealthy nation deserves more attention than equivalent risk reduction in a poor nation.

This Article is organized as follows. Part II clarifies the theory behind the valuation of statistical lives. The major point here is that regulators do not really use a VSL; instead they use a mean WTP to eliminate a statistical risk. For example, agencies might say that they are using a VSL of $6 million, but if so, they are relying on evidence more or less establishing that the average person pays, or is paid, $60 to eliminate a risk of 1/10,000. Part III, in some ways the heart of the essay, explores the need for individuation across both risks and persons. Part IV offers a more ambitious discussion of the uses and limits of willingness to pay in regulatory policy. It distinguishes between easy and hard cases for using WTP. The central claim here is that the argument for using WTP is strongest when the beneficiaries of regulation must pay all of its cost—though even in that event, the argument is subject to important qualifications, above involving bounded rationality. The argument for using WTP is weaker when the beneficiaries of regulation pay only a fraction of that cost. In the latter circumstances, some people will benefit from regulation even if it is inefficient in economic terms. I discuss the implications of this point for a uniform or fully individuated VSL.

II. WTP: Theory and Practice

It has now become standard for regulatory agencies to assign monetary values to human lives. Consider the following table, which captures agency practices from 1996 through 2003:

Table 1: Agency Values of Life, 1996–2003

Agency	Regulation and Date	Value of Statistical Life
Dept of Transportation/Federal Motor Carrier Safety Administration	Safety Requirements for Operators of Small Passenger-Carrying Commercial Motor Vehicles Used in Interstate Commerce August 12, 2003 68 FR 47860-01	$3 million
Dept. of Health & Human Services/FDA	Food Labeling: Trans Fatty Acids in Nutrition Labeling, Nutrient Content Claims, and Health Claims July 11, 2003 68 FR 41434-01	$6.5 million
Dept. of Agriculture Food Safety and Inspection Service	Control of 1Listeria Monocytogenes in Ready-to-Eat Meat and Poultry Products June 6, 2003 68 FR 34208-01	$4.8 million
Dept. of Health & Human Services/FDA	Labeling Requirements for Systemic Antibacterial Drug Products Intended for Human Use February 6, 2003 68 FR 6062-01	$5 million
Office of Management and Budget	Report to Congress on the Costs and Benefits of Federal Regulations February 3, 2003 68 FR 5492-01	$5 million
EPA	Control of Emissions from Nonroad Large Spark-Ignition Engines, and Recreational Engines (Marine & Land-Based) November 8, 2002 67 FR 68242-01	$6 million
EPA	National Primary Drinking Water Regulations: Arsenic and Clarifications to Compliance and New Source Contaminants Monitoring January 22, 2001 66 FR 6976-01	$6.1 million
EPA	Control of Air Pollution from New Motor Vehicles: Heavy-Duty Engine and Vehicle Standards and Highway Diesel Fuel Sulfur Control Requirements January 18, 2001 66 FR 5002-01	$6 million
EPA	Control of Air Pollution from New Motor Vehicles: Tier 2 Motor Vehicle Emissions Standards and Gasoline Sulfur Control	$5.9 million

	Requirements February 10, 2000 65 FR 6698-01	
EPA	Findings of Significant Contribution and Rulemaking on Section 125 Petitions for Purposes of Reducing Interstate Ozone Transport January 18, 2000 65 FR 2674-01	$5.9 million
EPA	Final Standards for Hazardous Air Pollutants for Hazardous Waste Combustors September 30, 1999 64 FR 52828-01	$5.6 million
EPA	National Primary Drinking Water Regulations: Disinfectants and Disinfection Byproducts December 16, 1998 63 FR 69390-01	$5.6 million
Dept. of Transportation/FAA	Financial Responsibility Requirements for Licensed Launch Activities August 26, 1998 63 FR 45592-01	$3 million
Dept. of Health & Human Services/FDA	Quality Mammography Standards October 28, 1997 62 FR 55852-01	$2 - 3 million
Dept. of Health & Human Services/FDA	Regulations Restricting the Sale and Distribution of Cigarettes and Smokeless Tobacco to Protect Children and Adolescents August 28, 1996 61 FR 44396-01	$2.5 million
Dept. of Agriculture/Food Safety & Inspection Service	Pathogen Reduction; Hazard Analysis and Critical Control Point (HACCP) Systems July 25, 1996 61 FR 38806-01	$1.6 million
Dept. of Transportation/FAA	Aircraft Flight Simulator Use in Pilot Training, Testing and Checking and at Training Centers July 2, 1996 61 FR 34508-01	$2.7 million
Consumer Product Safety Commission	Requirements for Labeling of Retail Containers of Charcoal May 3, 1996 61 FR 19818-01	$5 million
Consumer Product Safety Commission	Large Multiple-Tube Fireworks Devices March 26, 1996 61 FR 13084-01	$3 - $7 million

These number show substantial variations, though less so than even ten years ago.[25] The variations appear not to have any rationale behind them; agencies with higher or lower numbers have not explained their choices. The prior question is how agencies

[25] See Adler and Posner, supra note, for a slightly dated report that shows larger disparities.

generate monetary amounts of this kind. The answer comes from two kinds of evidence. The first and most important involves real-world markets, producing evidence of compensation levels for actual risks.[26] In the workplace and for consumer goods, additional safety has a price; market evidence is investigated to identify that price.[27] The second kind of evidence comes from contingent valuation studies, asking people how much they are willing to pay to reduce statistical risks.[28] The EPA's $6.1 million is a product of studies of actual workplace risks, attempting to determine how much workers are paid to assume mortality hazards.[29] The relevant risks usually are in the general range of 1/10,000 to 1/100,000.[30] The calculation of VSL is a product of simple arithmetic. Suppose that workers must be paid $600, on average, to eliminate a risk of 1/10,000. If so, the value of a statistical life would be said to be $6 million.

For some of the two dozen studies on which agencies currently rely,[31] consider the following table:[32]

Table 2: Value of Life Studies

Study	Method	Value of Statistical Life
Kniesner and Leith (1991)	Labor market	$0.7 million
Smith and Gilbert (1984)	Labor market	$0.8 million
Dillingham (1985)	Labor market	1.1 million
Marin and Psacharopoulos (1982)	Labor market	3.4 million
V.K. Smith (1976)	Labor market	5.7 million
Viscusi (1981)	Labor market	7.9 million
Leigh and Folsom (1984)	Labor market	11.7 million
Leigh (1987)	Labor market	12.6 million
Garen (1988)	Labor market	16.3 million

[26] See W. Kip Viscusi, supra note.
[27] A valuable and comprehensive overview can be found in Viscusi and Aldy, supra note.
[28] See, e.g., James Hammitt and Jin-Tau Liu, Effects of Disease Type and Latency on the Value of Mortality Risk, 28 J Risk and Uncertainty 73 (2004).
[29] See Viscusi, Fatal Tradeoffs, supra note, for discussion.
[30] See, e.g., W. Kip Viscusi, The Value of Life: Estimates With Risks by Occupation and Industry, 42 Ec. Inquiry 29, 33 (2004) (showing fatality risks ranging from about 1/100,000 to 45/100,000).
[31] For an accessible outline, see Richard W. Parker, Grading the Government, 70 U Chi L Rev 1345, 1485-86 (2003).
[32] See EPA, Guidelines for Preparing Economic Analyses 89 (2000).

A large advantage of labor market studies of this kind is that they avoid the lively disputes over the use of "willingness to pay" or "willingness to accept" in regulatory policy.[33] In many contexts, people demand more to give up a good than they are willing to pay to obtain it in the first instance—a disparity that much complicates efforts to assign monetary values to regulatory benefits, including mortality and morbidity.[34] If people are willing to pay $25 to eliminate an existing risk of 1/100,000, but demand $100 to incur a new risk of 1/100,000, then it is difficult to know how to proceed for purposes of monetary valuation of risks. Fortunately, this problem dissipates in the context of labor market studies. If workers who face a risk of 1/10,000 are paid $600 more for doing so, and if workers who refuse to face such a risk are being paid $600 less, then it is irrelevant whether we speak in terms of WTP or WTA.

Nonetheless, some questions might be raised about the use of these studies by EPA and other agencies.[35] Most obviously, the studies show significant variety in the crucial numbers, ranging from $0.7 million, in 1997 dollars, to $16.3 million. The EPA has adopted the $6.1 million figure on the ground that it represents the median in the relevant studies. But there is a risk of arbitrariness in fastening on that median figure, certainly if we lack reason to believe that the relevant study is the most accurate. In fact a more general look at the VSL data produces further puzzles and wider ranges. Some studies find no compensating differentials at all, indicating a VSL of zero[36]—implausibly low, to say the least, for purposes of policy. Others find that non-unionized workers receive negative compensating differentials for risk, that is, they appear to be paid less because they face mortality risks.[37] Another study finds that African-Americans receive no significant compensating wage differential and hence that their particular VSL is zero.[38] On the other hand, it is possible to find studies finding a VSL not below the range

[33] See Russell Korobkin, The Endowment Effect and Legal Analysis, 97 Nw. U.L. Rev. 1227 (2003).
[34] See id.; Cass R. Sunstein, Endogenous Preferences, Environmental Law, 22 J. Legal Stud. 217, 246-47 (1993).
[35] *See* Parker, supra note, and Robert Frank & Cass R. Sunstein, *Cost-Benefit Analysis and Relative Position*, 68 U. CHI. L. REV. 323 (2001), for several such questions.
[36]See Peter Dorman and P. Hagstrom, Wage Compensation for Dangerous Work Revisited, 52 Industrial and Labor Relations Review 116 (1998).
[37] Viscusi and Aldy, supra note, at 44.
[38] Leeth and Ruser, supra note.

in Table 1 but above it; consider the finding that for people who choose jobs with low level risks, the VSL is as much as $22 million.[39]

The most recent meta-study, far more comprehensive than EPA's own analysis, finds that most studies produce a range of between $3.8 million and $9 million.[40] The range is fairly compressed, in a way that disciplines agency decisions; for many regulations, the "bottom line" of the cost-benefit assessment will not be affected by a choice of $3.8 million or $9 million for VSL. But that range still leaves significant room for discretion, in a way that would have significant implications for policy and law. Consider the fact that the monetized value of a program that saves 200 lives would range from $760 million to $1.8 billion; consider also the fact that the EPA's highly publicized arsenic regulation would easily fail cost-benefit analysis with a $3.8 million VSL but easily pass with a $9 million VSL.[41] The simple point is that the variety of the outcomes raises questions about the reliability of any particular figure.

In addition, most of these studies on which EPA relies are based on data from the 1970s. Since that time, there has been significant growth in national income, in a way that suggests that any VSL derived from 1970s data is too low. Of course people with more money are expected to be willing to pay more, other things being equal, to reduce statistical risks. One study finds that at the beginning of the twentieth century, VSL was about $150,000 in current dollars—less than one-twentieth of the corresponding amount a century later.[42] On reasonable assumptions, the EPA's use of 1970s data has produced a significant undervaluation of the monetary value of the lives at stake, for the $6.1 million figure reflects no adjustment to account for changes in national real income growth.[43] In principle, the failure to undertake an adjustment is a serious mistake. The actual amount might be substantially higher.[44]

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[39] Viscusi and Aldy, supra note, at 23.

[40] See id. at 18.

[41] See Sunstein, The Arithmetic of Arsenic, supra note. The regulation was projected to cost about $200 million, and its monetized benefits, with a $6.1 million VSL, were around $190 million. See id. It should be easy to see that a $3.8 million VSL would make the regulation impossible to defend – and a $9 million VSL would make it impossible to challenge.

[42] See Viscusi and Aldy, supra note, at 22.

[43] EPA has updated the relevant numbers for inflation, but it has not otherwise made adjustments.

[44] See Dora L. Costa & Matthew E. Kahn, The Rising Price of Nonmarket Goods, 93 Am. Econ. Rev. (Papers & Proc.) 227, 229 tbl.1 (2003) (suggesting likely current value of $12 million). For recent evidence that the current numbers are indeed too low, see W. Kip Viscusi, Racial Differences in Labor Market Values of a Statistical Life, 27 J. Risk & Uncertainty 239, 252 tbl.5 (2003) [hereinafter Viscusi, Racial

Let us suppose that these problems can be solved and that we can identify a number, call it $6 million, that really represents people's valuations. It should be clear that even if this were so, it is grossly misleading to offer the following suggestion: The value of a statistical life is $6 million. It would be much more accurate to say that for risks of 1/10,000, the median WTP, in the relevant population, is $600—or that for risks of 1/100,000, the median WTP is $60. If true, these statements would, on assumptions to be explored, be extremely helpful for purposes of policy. But even at first glance, we can see that these numbers need not be taken to support a VSL that is independent of probability.[45] Suppose that people would be willing to pay $60 to reduce a risk of 1/100,000. From this it does not follow that people would be willing to pay $6 to eliminate a risk of 1/1 million, or $6000 to reduce a risk of /1000, or $60,000 to reduce a risk of 1/100. It is plausible to think that people's WTP to reduce statistical risks is nonlinear.[46] As the probability approaches 100%, people become willing to pay an amount for risk reduction that arises nonlinearly to 100% of their income; as the risk approaches 0%, WTP nonlinearly approaches nothing. For a risk of 1 in 1million, for example, many reasonable people would be willing to pay zero, treating that risk as inconsequential.

Hence the claim that VSL is $6.1 million is merely a shorthand way of saying that people are willing to pay from $600 to $60 to eliminate risks of 1/10,000 to 1/100,000. Since this is the range for risks with which most agencies deal, the relevant data is highly informative. For current purposes, this point is the crucial one.

III. Individuation

My basic claim is that VSL will inevitably vary across both risks and persons. If people's WTP is higher to avoid cancer risks than risks of unanticipated, sudden deaths, then the use of a VSL, drawn from studies of the latter risks, will ensure insufficient

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Differences], finding values as high as $15.1 million in the case of white males. In the context of arsenic regulation, the EPA also noted in its sensitivity analysis that the appropriate adjustment would increase the VSL from $6.1 million to $6.7 million. 66 Fed. Reg. at 7012. For recent evidence, suggesting that the current VSL is $4.7 for a full sample, $7 million for blue-collar males, and $8.5 for blue-collar females. See W. Kip Viscusi, The Value of Life: Estimates With Risks by Occupation and Industry, 42 Ec. Inquiry 29 (2004).

[45] See Richard Posner, forthcoming book.

[46] See id.

protection of the exposed population. If people in different occupations are paid different amounts to incur a risk, then use of an uniform VSL will not track actual behavior, which is what it is supposed to do.[47] If wealthy people show a higher WTP than poor people, then a uniform WTP, based on a population-wide median, will ensure insufficient protection of wealthy people and excessive protection of poor people—in a way that might well prove harmful to both groups.[48]

To test these issues in a highly preliminary way, I conducted a small contingent valuation study. Eighty-four University of Chicago law students were asked about their WTP to eliminate each of five risks of 1/100,000. The simplest of these risks involved dying from an automobile accident as a result of a defective brake. The four other risks might be expected to occasion greater concern; they involved deaths from lung cancer, AIDS, Alzheimer's disease, and dying in an airplane crash as a result of a terrorist attack. The 1/100,000 risk of dying in an automobile accident produced a mean WTP of $156, whereas the four other accidents produced significantly higher amounts (ranging from $184 for the AIDS risk to $193 for Alzheimer's disease). In addition, there was substantial heterogeneity across individuals. For each of the questions, about ten respondents were willing to pay nothing to eliminate the 1/100,000 risk, producing a VSL of 0. And for each of them, about fifteen people were willing to pay at least $500 to eliminate the 1/100,000 risk, producing a VSL of $50 million. Let us now turn to the possibility of substantial diversity across both risks and persons.

A. Risks

I have emphasized that the data that underlies the $6.1 million figure comes from risks of accidents in the workplace—and that even if this data can be generalized, it would not justify a probability-independent VSL. But there is a point of greater practical importance. A 1/100,000 risk of dying in a workplace accident might well produce a different WTP from a 1/100,000 risk of dying of cancer from air pollution, which might in turn be different from a 1/100,000 risk of dying in an airplane as a result of a terrorist

[47] W. Kip Viscusi, The Value of Life: Estimates With Risks by Occupation and Industry, 42 Ec. Inquiry 29, 33, 39-41 (2004)
[48] On the "might well," see below.

attack, and that number might in turn by different from a 1/100,000 risk of dying as a result of a defective snowmobile. The very theory that lies behind the government's current use of VSL justifies a simple conclusion: VSL should be risk-specific; it should not be the same across statistically equivalent risks. The use of a single number almost certainly produces significant blunders.

1. Data. Notice initially that the very category of "workplace risks" conceals relevant differences. The American economy contains a wide range of occupations and industries, and a uniform VSL should not be expected to emerge from each of them. Indeed, a recent study finds significant differences across both occupations and industries,[49] with blue collar workers showing a higher VSL than others.[50] It is inevitable that a wide range of values would emerge from studies that looked separately at machine operators, executive positions, sales, dental technicians, equipment cleaners, security guards, and secretaries[51]—and undoubtedly diverse values could be found within each category.

In addition, many risks controlled by the EPA are qualitatively different from the workplace risks that EPA has used to generate its VSL. Two differences are particularly important. First, the workplace studies do not involve cancer, and cancer risks are often involved in environmental decisions. There is considerable evidence that the risks associated with cancer produce a higher WTP than other kinds of risk.[52] For example, Hammit and Liu find that in Taiwan, willingness to pay to eliminate a cancer risk is about one-third larger than WTP to avoid a risk of a similar, chronic degenerative disease.[53] Some contingent valuation studies suggest that people are willing to pay twice as much to prevent a cancer death as an instantaneous death.[54] People seem to have a special fear of cancer, and they seem to be willing to pay more to prevent a cancer death than a sudden unanticipated death, or a death from heart disease.[55] The "cancer premium" might be

[49] W. Kip Viscusi, The Value of Life: Estimates With Risks by Occupation and Industry, 42 Ec. Inquiry 29, 39-41 (2004)
[50] Id.
[51] See id. at 33. Viscusi does not produce separate numbers for the different occupation groups, but his data clearly indicate that separate numbers would emerge.
[52] See Richard L. Revesz, Environmental Regulation, Cost-Benefit Analysis, and the Discounting of Human Lives, 99 Colum. L. Rev. 941, 962–74 (1999).
[53] See Hammitt and Liu, supra note.
[54] *See Id.*
[55] *See* GEORGE TOLLEY ET AL., STATE OF THE ART HEALTH VALUES 339-40 (1993).

produced by the "dread" nature of cancer; it seems well-established that dreaded risks produce special social concern, holding the statistical risk constant.[56]

To be sure, existing evidence on this count is not unambiguous. One study of occupational exposures does not find a significantly higher VSL for cancer risks.[57] But that study assumes that occupational cancers account for 10-20 percent of all cancer deaths—an amount that is almost certainly too high. If occupational exposures account for 5% of all cancers—a far more realistic number—then the VSL for cancer risks may be as high as $12 million, about double the amount that EPA now uses. The current findings conflict[58]; but in principle, the VSL figures should be risk-specific, and we know enough to suspect that cancer risks produce an unusually high VSL.

The second difference between workplace risks and the risks that concern EPA is that the latter risks seem peculiarly involuntary and uncontrollable.[59] Unlike the risks of workplace accidents, pollution risks are not assumed voluntarily in return for compensation.[60] A great deal of literature suggests that involuntary, dread, uncontrollable, and potentially catastrophic risks produce unusually high levels of public concern.[61] If so, the numbers that derive from workplace accidents will substantially understate willingness to pay for regulatory benefits provided by the EPA and many other agencies as well.[62]

The implications go well beyond the distinction between workplace accidents and environmental risks. For example, people appear to be willing to pay far more to produce safety in the air than to produce safety on the highways[63]; it follows that VSL should be higher for the Federal Aviation Administration than for the National Highway Traffic

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[56] See Paul Slovic, The Perception of Risk (2000).

[57] See Viscusi and Aldy, supra note, at 22. In the same vein, see W. Magat et al., A Reference Lottery Metric for Valuing Health, 42 Management Science 1118 (1996) (finding no difference between valuations of cancer death and auto accident death).

[58] Id. at 57.

[59] See Frank Ackerman and Lisa Heinzerling, Priceless: On Knowing the Price of Everything and the Value of Nothing (2003).

[60] Of course it is possible to question the idea that workplace risks are assumed voluntarily and in return for compensation. For example, many workers probably do not know the risks that they face. The distinction I am drawing here is one of kind rather than degree. See Cass R. Sunstein, *Bad Deaths*, 14 J. RISK & UNCERTAINTY 259 (1997).

[61] *See* SLOVIC, The Perception of Risk, supra note.

[62] See Frank Ackerman and Lisa Heinzerling, Priceless: On Knowing the Price of Everything and the Value of Nothing (2003).

[63] See Carlsson et al., supra note.

Safety Administration. Oddly, the former agency has an unusually low rather than an unusually high VSL.[64] Some diseases would produce a higher VSL than others. A 1/100,000 risk of death from Alzheimer's disease, for example, would almost certainly produce a higher VSL than 1/100,000 risk of death from a heart attack; 1/50,000 risk of an AIDS death would not produce the same VSL as a 1/50,000 risk of death from a defective brake system on an automobile; most people would pay more to reduce a risk of dying from slow-acting strokes than from strokes that kill outright. There should be a distinctive population-wide median VSL for mortality risks of airplane accidents, of cancer from air pollution, of motor vehicle accidents, of defective toys, of cancer from water pollution.

In fact studies have been done for seatbelt use, automobile safety, home fire detectors, and more, and they find a wide variety of numbers, with a VSL ranging from $770,000 (smoke detectors, based on data in the 1970s) to $9.9 million (fatality risks associated with safety belts and motorcycle helmets).[65] And within each of these categories, further distinctions would undoubtedly emerge. All cancer fatalities are not the same; informed people would surely make distinctions between those that involve long periods of suffering and those that do not. If we are really interested in basing VSL on WTP, a uniform number, treating all statistically identical mortality risks as the same, is fatally obtuse.

2. Practice. These claims are not entirely foreign to current regulatory policy. In the context of arsenic regulation, the EPA was alert to some of them.[66] Hence its own sensitivity analysis for arsenic suggested the need for an upward revision of 7%, because of the involuntariness and uncontrollability of the risk.[67] With this revision, along with the revision for income growth, the value of a statistical life would rise from $6.1 million to $7.2 million.[68] In fact there are reasons to suggest that this amount might be far too low. Dean Revesz suggests that "the value of avoiding a death from an involuntary, carcinogenic risk should be estimated as four times as large as the value of avoiding an

[64] See Table I supra.
[65] Viscusi and Aldy, at 25.
[66] See Sunstein, The Arithmetic of Arsenic, supra note.
[67] 66 Fed. Reg. at 7014.
[68] *Id.*

instantaneous workplace fatality."[69] If we take this approach, the VSL, in the context of arsenic, jumps from $6.1 million to $24.3 million. I am not arguing that $24.3 million is the correct number; I am suggesting only that VSL is almost certainly risk-specific.

3. Qualifications. Three qualifications are important. First, psychological studies about heightened public concern[70] may not translate into higher WTP. Social scientists might be able to show that certain qualitative factors make people especially concerned about certain risks, but it is an independent question whether and how much WTP increase as a result. Fortunately, a number of studies of WTP contain at least suggestive answers to that question, demonstrating that VSL does vary significantly across areas.[71]

Second, it is important not to think that there is a rigid dichotomy between the involuntary/uncontrollable and the voluntary/controllable.[72] This is a continuum, without sharp divisions among various points, and hence it is a mistake to believe that risks can be neatly separated into the two categories. Are the risks from air pollution in Los Angeles involuntarily incurred? The answer might seem to be affirmative, but people have a choice whether or not to live in Los Angeles. Are the risks of airplane travel uncontrollable? Many people think so, but the decision to fly is itself under human control. Death from an asteroid seems to be a model case of involuntariness, at an opposite pole from hang-gliding. But why? In deciding whether a risk is faced involuntarily, or whether it is within personal control, the underlying issues seem to be whether those exposed to the risk are exposed knowingly and whether it is costly or otherwise difficult for people to avoid the risk.[73] When risks are approached in these terms, it is clear that some risks are worse than others, even if the probability of harm is identical. This point is enough to suggest that VSL cannot be uniform across risks.

Third, it is possible that extreme aversion to certain risks reflects a form of bounded rationality[74]—and hence it is possible to doubt whether that extreme aversion should be allowed to play a role in regulatory policy. Suppose, for example, that people really are willing to pay twice as much to avoid a cancer risk as to avoid a sudden,

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[69] *See* Revesz, *supra* note 7, at 982.
[70] See Slovic, supra note.
[71] See Hammitt and Liu, supra note, and the meta-analysis in Viscusi and Aldy, supra note.
[72] *See* Cass R. Sunstein, *Bad Deaths*, 14 J. RISK & UNCERTAINTY 259 (1997).
[73] See id.
[74] See Sunstein, Lives, Life-Years, and Willingness to Pay, supra note.

unanticipated death. Must these numbers be decisive for purposes of policy, assuming that the contingent valuation study is reliable? They might not be *if* we have reason to believe that the WTP figures are not accurately measuring welfare. And is it even plausible to think that the "cancer premium" is so high that it actually doubles the cost of death? Is it reasonable to think that a death from cancer is actually *twice* as bad as a death that is sudden and unanticipated? To be sure, a degree of pain and suffering typically accompanies cancer, and this point helps explain the obtuseness of using the same number for cancer risks as for risks of sudden, unanticipated deaths. But it is not easy to defend the set of (exotic) values that would lead to the conclusion that the relevant pain and suffering is as bad as death itself. If WTP is not measuring welfare here, and if the inflated numbers for cancer deaths are a product of an intuitive recoil or terror at the idea of cancer, then regulators might not use the unrealistically high monetary values. To be least controversial, WTP numbers would reflect informed rather than reflexive judgments about the nature of the harms involved.

B. Persons

Even when risks are identical, people are heterogeneous in their values and their preferences. The $6.1 million itself is the median figure—it is the median of a set of means. But everyone agrees that in workplaces and elsewhere, individual WTP is highly variable. Some of the variability stems from different degrees of aversion to different risks. Some people are especially concerned to avoid the dangers associated with pesticides, whereas others focus on the risks of air travel; some of these differences are a product of beliefs (about existing risk levels) and others of tastes and values. So too, those with high levels of background risk should be expected to be willing to pay less to avoid an additional risk of 1/100,000 than those with low levels of background risk. If a relevant population faces thirty annual mortality risks of 1/10,000 or higher, it should be expected to show a lower VSL with respect to a new risk of 1/100,000 than a population whose background risks are less serious.[75] The difference between the VSL of people in

[75] See Louis R. Eeckhoudt and James K. Hammitt, Background Risks and the Value of a Statistical Life, 23 J Risk and Uncertainty 261 (2001).

wealthy nations and that of people in poor nations, taken up below, is partly a product of the fact that the latter group generally faces far higher background risks.

It is likely that WTP varies with respect to age as well. We might well predict that other things being equal, older people will show a lower WTP and hence a lower VSL, simply because they have fewer years left. One study, for example, finds that the VSL of a 48-year-old is 10 percent lower than that of a 36-year-old; another finds that people under 45 has a VSL twenty times higher than people over 65.[76] The most careful analysis suggests that VSL peaks around age thirty, stays constant for about a decade, but declines from that point, so much so that the VSL for a 60-year old is approximately half of that of people from thirty to forty.[77] These findings raise particular conundrums in the case of people under eighteen, including children; how should government proceed if the VSL for those between infancy and fifteen years of age show a tiny VSL, simply because they have little or no money? It is implausible to use a tiny VSL for them; but what number should be used, and why? Little progress has been made on this question,[78] with the government using its ordinary, uniform number for children as for everyone else.[79] But if we put the vexing case of valuing children to one side, then the prevailing theory suggests a lower VSL for those at the last stages of life than for those who have many decades to go—and that this difference ought to be reflected in regulatory policy.[80]

Along the same lines, many analysts have suggested that regulatory policy should focus not on statistical lives but on statistical life-years (VSLY).[81] Suppose that they are right. If so, then the statistical lives of young people are likely to be worth more than the statistical lives of older people. The government's interest in focusing on VSLY led to widespread public objections to what, under one proposal, would seem to be a "senior death discount"—in accordance with which someone over seventy would be "worth" 58

[76] See Viscusi and Aldy, supra note, at 51. For contrary evidence, see Sunstein, Lives, Life-Years, and Willingness to Pay, supra note.
[77] See Joseph Aldy and W. Kip Viscusi, Age Variations in Workers' Value of Statistical Life (2003), available on ssrn.com.
[78] For an overview that turns out to be highly tentative and indeterminate, see Environmental Protection Agency, Children's Health Valuation Handbook (2003).
[79] See id. at 3-12-3-13, referring to Environmental Protection Agency, Guidelines for Preparing Economic Analyses (2000).
[80] See Sunstein, supra note.
[81] See id.

cents on the dollar.[82] But assuming that people over 70 are willing to pay about 58%, on average, of what people under 70 are willing to pay, the theory that underlies current practice justifies exactly this disparity. If the theory is right (a question to which I will turn), then a disparity between older people and younger people make perfect sense to the extent that the WTP figures justify it.

Even more fundamentally, those with little to spare will show a far lower VSL than those who have plenty. WTP depends on ability to pay (ATP), and when ATP is low, WTP will of course be low as well, holding preferences constant. For this reason the VSL of people with an annual income of $50,000 will be lower than that of people with an annual income of $150,000. People in the former category might be willing to pay no more than $25 to reduce a risk of 1/100,000, where people in the latter group might be willing to pay as much as $100. If so, government should not require everyone to pay $100; its decision to do so would harm those unwilling to pay that amount.[83] A uniform VSL, of the sort that government now uses, threatens to "overprotect" the poor, in a way that might well be harmful to them—and also threatens to underprotect the wealthy, in a way that is highly likely to be harmful to them.[84]

As a simple matter of fact, we would expect that unionized workers would receive more compensation for incurring risks—and studies almost always show a higher VSL for unionized workers, with amounts found to be as high as $12.3 million, $18.1 million, and even $44.2 million.[85] We would expect to find large differences across nations, with VSL being higher in rich countries than in poor ones. And in fact, studies find a VSL as low as $200,000 for Taiwan, $500,000 for South Korea, and $1.2 million for India—but $21.7 million for Canada and $19 million for Australia.[86] Consider, for purposes of illustration, the following table[87]:

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[82] See id.
[83] I am assuming adequate information and unbounded rationality; for discussion, see TAN infra.
[84] Compare EPA's explicit and unexplained refusal to consider differences "in age, health status, socioeconomic status, gender or other characteristic of the adult population." 68 Fed. Reg. 1660, 1695 (Jan. 13, 2003).
[85] See Viscusi and Aldy, supra note, at 45,
[86] See id. at 27-28.
[87] Drawn from id. at 26-27.

Table 3: VSL Across Nations

Nation and year of study	VSL (in 2000 US$)
Japan (1991)	$9.7 million
South Korea (1993)	$0.8 million
Canada (1989)	$3.9–4.7 million
India (1996/97)	$1.2–1.5 million
Taiwan (1997)	$0.2–0.9 million
Australia (1997)	$11.3–19.1 million
Hong Kong (1998)	$1.7 million
Switzerland (2001)	$6.3–8.6 million
United Kingdom (2000)	$19.9 million

It would follow that within the United States, wealthy populations would show a higher VSL than poorer populations. If a program is designed to combat health risks in wealthy suburbs, the VSL would be above the population-wide median; if the protected population is mostly in poor areas, the VSL would be below it. Currently agencies pay no attention to this possibility in undertaking cost-benefit analysis.[88]

What about the more controversial categories of race and gender? Recent studies show significant differences. Using workplace data from 1996 to 1998, Leeth and Ruser find that women's VSL ranges from $8.1 million to $10.2 million, whereas men's VSL is less than half that, ranging from $2.6 million to $4.7 million.[89] Leeth and Ruser find that Hispanic males show a slightly higher VSL than white males ($5 million to $3.4 million)[90]—and most strikingly, that African-Americans receive no compensation for workplace risks, producing a VSL of 0.[91] Using workplace data from 1992 through 1997, Viscusi also finds a significant disparity across racial lines, though his numbers are quite different from those found by Leeth and Ruser.[92] In Viscusi's study, the VSL is highest for white males and lowest for African-American males, with white females and African-Americans falling between the poles. More particularly, Viscusi finds that the overall white VSL is $15 million, while the overall African-American VSL is $7.2 million.[93] For

[88] See Adler and Posner, supra note.
[89] See Leeth and Ruser, supra note, at 266.
[90] Id. at 270.
[91] Id. at 275.
[92] See Viscusi, Racial Differences, supra note, at 252.
[93] See Viscusi, Racial Differences, supra note, at 252.

white females, the overall VSL is $9.4 million, compared to $18.8 million for white males; for African-American females, the overall VSL is $6.9 million, compared to $5.9 million for African-American males. Another study by Viscusi finds a VSL of $7 million for blue-collar males and $8.5 million for blue-collar females.[94] The differences between Leeth and Ruser on the one hand and Viscusi on the other remains a puzzle. For my purposes, the central point is that demographic differences in VSL are entirely to be expected, and they are found in both studies.

C. Theory and Practice

If we put the foregoing points together, we can see that there is not one VSL, but an exceptionally large number of VSLs. In fact each of us has not one VSL but a number of them, targeted to each risk that each of us faces. A policy that truly tracks WTP would seek to provide each person with the level of protection for which he is willing to pay to reduce each risk. Tracking WTP is the goal that underlies current practice; and apart from questions of administrability, it calls for a maximum level of individuation.

1. A thought experiment. As a thought experiment, suppose that an all-knowing regulator could costlessly determine each person's WTP for each statistical risk that she faces—and perfectly match the level of regulatory protection to that WTP. In these circumstances, the regulator should give each person no more and no less than his WTP for each risk that he faces. (In cases in which people's WTP is low because they are poor, they might be subsidized; but they would not be forced to purchase goods for an amount in excess of their WTP. I will return to this point,[95] but subsidies are not my topic here.) Under this approach, regulatory benefits would be treated the same as every other commodity that is traded on markets, including safety itself. Of course most people face extremely serious problems in dealing with risk, stemming both from an absence of information and from bounded rationality.[96] The all-knowing regulator would overcome these problems and provide people with what they would want if they did not suffer from them. If we could do this, then the current theory would be perfectly implemented. If so, it would follow that with full individuation, overall WTP would be lower for poor people

[94] See Viscusi, Value of Life, supra note, at 39.
[95] See TAN below.
[96] See Christine Jolls et al., A Behavioral Approach to Law and Economics, 50 Stan L Rev 1471 (1998).

than for wealthy people, for African-Americans than for whites, and (possibly) for men than for women. But under this thought experiment, government would not discriminate against any group by deciding (for example) on a high VSL for programs with 95% whites and a lower VSL for programs with 55% African-Americans. The difference would be a product of aggregations of fully individual VSL—aggregations of the kind that the most conventional markets, including those for automobiles and consumer goods, now provide.

Of course there are two practical problems with taking the thought experiment seriously. The first is that we do not know the WTP of every individual, and as a practical matter, it is not possible to find out. The second problem is that regulatory benefits are often collective goods—goods that cannot feasibly be provided to one without also being provided to many. In the context of air pollution, for example, it is not possible to provide cleaner air for some without providing cleaner air for many or all. In regulating air pollution and water pollution, individuation is simply not an option.

These problems are fatal objections to full individuation. But they are not fatal objections to more individuation. At a minimum, agencies should be encouraged to take account of existing research in their sensitivity analyses, which would result (for example) in increased "upper bound" estimates for cancer risks.[97] In addition, disparities in VSL findings might be mapped onto different agency estimates, producing reasonable rather than arbitrary differences across agencies. If, for example, the risks of death from workplace accidents produce a lower number than the risks of death from consumer products, then the Occupational Safety and Health Administration might have a lower VSL than the Consumer Product Safety Administration. We could easily imagine a research program in which the Office of Information and Regulatory Affairs attempts to elicit far more information on VSL across different risks. A movement in this direction need not raise troubling ethical questions.

It would be far more controversial to suggest that agencies should adopt different VSLs depending on whether the affected population is especially wealthy or especially poor. But at the very least, agencies should adjust VSL to changes in national wealth over

[97] See the discussion of the sensitivity analysis for arsenic, supra note.

time, producing a higher amount than would come from inflation adjustments alone.[98] Or suppose, for example, that a regulation is designed to protect migrant farmworkers, expected to show a low VSL. Current studies in fact estimate the relationship between income and VSL,[99] allowing agencies to make suitable adjustments. And when the population is relatively wealthy, the agency might adopt a higher VSL. For present purposes, I am suggesting only that an approach of this kind is indicated by the theory that government now uses. I will turn in Part IV to the larger questions that such an approach would make it necessary to answer.

2. Optimal individuation. The larger question is simple: What is the optimal level of individuation with respect to the value of life? The answer depends in part on how much we know. Even in markets, individuals are not usually asked, and charged, their particular WTP. In real estate markets, negotiation between individuals is the usual practice. But for ordinary consumer goods—cereal, soap, casebooks, subscriptions to law reviews—a standard price emerges from the forces of supply and demand. It seems clear that a uniform value of life, cutting across domains in which those forces almost certainly establish disparate amounts, fits poorly with the theory that currently underlies government practice. It is also clear that full individuation is not feasible. The appropriate intermediate approach depends on two familiar variables: the costs of decisions and the costs of errors. In the early years of cost-benefit analysis, a uniform number is probably the best that agencies could do. As better information emerges about different VSLs across risks and persons, the use of a uniform number will be increasingly difficult to support. And if those differences are substantial, the argument for further differentiation will be strengthened. We might see a uniform number as a plausible "first generation" response to the problems posed by cost-benefit analysis. The second generation is now well underway, and hence finer distinctions will be increasingly hard to resist.

D. Administrative Law

How do these points bear on the legality of agency action? Courts have started to develop principles by which to review agency decisions about how to assess the costs and

[98] See note supra.
[99] See Viscusi and Aldy, supra note.

benefits of regulation.[100] Some statutes explicitly require agencies to balance costs against benefits, and under such statutes the agency's choices about valuation might be challenged as unreasonable or arbitrary.[101] If an agency used a VSL of $200,000, it would almost certainly be assigning an arbitrarily and hence unlawfully low monetary value; if it used a VSL of $40 million, its selection would be arbitrary high.[102] In all cases the agency is required to produce a reasonable explanation for why it has proceeded one way rather than another.[103]

In view of the arguments made thus far, we could easily imagine legal challenges to agency decisions. Suppose that the EPA continues to use the $6.1 million figure, based on workplace studies. The agency's decision would be vulnerable on several grounds. First, it might be too low in light of the growth in national income. Second, it fails to account for evidence that pollution risks, especially if cancer is involved, produce a higher VSL than workplace risks. Third, it does not, on the facts stated, come to terms with the possibility that the protected group is wealthier or poorer than the group involved in the workplace studies. All of these challenges are plausible under existing law. As new and better data emerge, they become stronger still. It is certainly possible than a decade from now, the use of a uniform figure will seem obtuse, even indefensible.

Is there anything than agencies might say in response? They might urge that the existing evidence is too ambiguous and contestable to justify a change in current practice. Most studies based on more recent data find a VSL in the range of $6.1 million.[104] With respect to cancer, EPA's Science Advisory Board (SAB) rejected an upward revision for especially dread illnesses, finding that the existing literature does not justify any such revision; and some evidence directly supports the view of the SAB.[105] To be sure, it is more than plausible to think that VSL is wealth-dependent; but EPA might urge that a uniform number is preferable on moral and distributive grounds and not greatly out of line with existing evidence. In any case, a single number might have the advantage of easy administrability—and produce results that in general would be the same as those

[100] The leading case is Corrosion Proof Fittings v. EPA, 947 F.2d 1201 (5th Cir. 1991). See also American Dental Association v. Martin, 984 F.2d (7th Cir. 1993).
[101] See, e.g., 15 USC 2601© (Toxic Substances Control Act).
[102] This is an implication of Corrosion Proof Fittings, supra note.
[103] Id.
[104] See, e.g., Leeth and Ruser, supra note.
[105] See Viscusi and Aldy, supra note 57.

produced by imaginable variations. Most of the time, the agency's choice will not be affected if it selects a VSL of $3.5 million or $10 million; if so, a uniform number would seem acceptable.

In many cases, I believe that these responses are unconvincing as a matter of policy. But in light of the properly limited role of courts in the oversight of agency action, they are convincing as a matter of law.[106] Courts should allow agencies considerable room to maneuver here, at least until the evidence against a uniform number becomes overwhelming. Permission to adopt such a number has an important corollary: An agency would be on firm legal ground if it attempted to make adjustments of the sort I have suggested, even if current evidence does not unambiguously support those adjustments.

IV. Why WTP? Easy Cases, Hard Cases

Thus far I have assumed that the theory behind current practice is straightforward—that it depends on an empirical elicitation of people's WTP as the foundation for VSL. If the assumption is correct, then a high degree of individuation is justified. But perhaps the assumption is false. Perhaps the prevailing theory does rely on elicited WTP, but also adopts a norm in favor of the equality of persons (and possibly mortality risks as well).[107] Might that more complex theory be correct? In any case, what is the argument for embodying people's actual WTP in regulatory policy? Why should anyone care about actual WTP at all? Why should government conduct cost-benefit analysis with close reference to VSL[108]?

A. Easy Cases

Let us begin with easy cases. For the sake of simplicity, assume a society in which people face multiple risks of 1/100,000, and in which every person is both adequately informed and willing to pay no more and no less than $60 to eliminate each of those risks. Assume too that the cost of eliminating these 1/100,000 risks is widely variable, ranging from close to zero to many billions. Assume finally that the cost of eliminating any risk is borne entirely by those who benefit from risk elimination. Under

[106] See Sunstein, The Arithmetic of Arsenic, for more extended discussion.
[107] Some support for this position can be found in the remarks of EPA, quoted in note supra.
[108] These questions are pressed in Ackerman and Heinzerling, supra note.

that assumption, regulation imposes the equivalent of user's fee; for example, people's water bills will entirely reflect the costs of a policy that eliminates a 1/100,000 of getting cancer from arsenic in drinking water. If the per-person cost is $100, each water bill will be increased by exactly that amount.

1. The straightforward argument. With these assumptions, the argument for using WTP is straightforward. Regulation amounts to a forced exchange; it tells people that they must purchase certain benefits for a certain amount. Why should government force people to pay for things that they do not want? By hypothesis, a forced exchange on terms that people dislike will make them worse off. The case for using WTP depends on the simple idea that government should make Pareto-superior moves (those that make at least one person better off without making anyone worse off) and that it should avoid making Pareto-inferior moves (those that make at least one person worse off without making anyone better off). At first glance, use of WTP and VSL, on the assumptions I am making, seems hard to contest.[109] For purposes of evaluating regulation, it does not matter if the existing distribution of income is unjust or if poor people are, in an intelligible sense, coerced to run certain risks. The remedy for unjust distributions, and for that form of coercion, is not to require people to buy regulatory benefits on terms that they find unacceptable.

Consider how this argument works with respect to risks and persons. Suppose that people are willing to pay no more than $50 to avoid a 1/100,000 risk of dying in a car crash, but they are willing up to $100 to avoid a 1/100,000 risk of dying of cancer. If government uses a WTP for both risks of $75, it will force people to pay more than they want to avoid the risks associated with airplane crashes, and less than they want to avoid risks of cancer. Why should government do that? And if the argument is convincing in this example, it should apply in numerous cases in which WTP and VSL vary across risks.

[109] I am putting to one side the possibility that WTP and hence VSL reflect competition for better relative position; if so, the VSL numbers, based on market evidence, are too low. See Frank and Sunstein, supra note. In brief: Suppose that workers (for example) are willing to pay only $250 annually to eliminate a 1/10,000 risk; suppose too that worker well-being depends, in large part, on relative income, not absolute income; and suppose finally that workers would be willing to pay more than $250 if all workers were simultaneously making the same payment, because in that event, relative position would not be compromised. Under these assumptions, the WTP numbers, based on market evidence or contingent valuation studies, underestimate VSL by a significant amount. See id.

With respect to persons, the argument is more controversial, above all because it treats poor people as less valuable (literally) than poor people. But at least at first glance, differences are appropriate here as well. The reason is not that poor people are less valuable than rich people. It is that no one, rich or poor, should be forced to pay more than they are willing to pay for the reduction of risks. This idea embodies a norm of equality. And if poor people are unwilling to pay much for the reduction of serious risks, the appropriate response is not a compelled purchase, but a subsidy. Suppose, for example, that each member of a group of relatively poor people, earning less than $30,000 annually, is willing to pay only $25 to eliminate a risk of 1/100,000—about one-half, let us suppose, of the nation's population-wide median of $50. Should regulators require every citizen, including those in the relatively poor group, to pay $50? In principle, the government should force exchanges only on terms that people find acceptable, at least if it is genuinely concerned with their welfare.

Does the easy case seem implausibly unrealistic? In many contexts, it certainly is. The costs of air pollution regulation are not fully borne by its beneficiaries.[110] But for workers' compensation regulation, the situation is very different: Nonunionized workers faced a dollar-for-dollar wage reduction, corresponding almost perfectly to the expected value of the benefits they received.[111] For drinking water regulation, something similar is involved. The cost of regulations is passed onto consumers in the form of higher water bills.[112] Hence the easy case finds a number of real-world analogues.

2. Objections. There are several possible objections. They point to some important qualifications, but none of them is a convincing refutation of the straightforward argument.

(a) Adaptive preferences and "miswanting." The first objection would emphasize the possibility that people's preferences have adapted to existing opportunities, including deprivation.[113] Perhaps people show a low WTP for environmental goods, including health improvements, simply because they have adjusted to environmental bads, including health risks. Perhaps people's WTP reflects an effort to reduce cognitive

[110] Matthew E. Kahn, The Beneficiaries of Clean Air Act Regulation, 24 Regulation 34 (2001).
[111] Price Fishback and Shawn Everett Kantor, A Prelude to the Welfare State (Chicago: University of Chicago Press, 1998).
[112] See Sunstein, The Arithmetic of Arsenic, supra note.
[113] See Jon Elster, Sour Grapes (1983); Adler and Posner, supra note.

dissonance through the conclusion that risks are lower than they actually are.[114] To generalize the objection, perhaps people suffer from a problem of "miswanting"[115]; they want things that do not promote their welfare, and they do not want things that would promote their welfare. If this is so, then WTP loses much of its underlying justification; people's decisions do not actually promote their welfare.[116] And if government can be confident that people are not willing to pay for goods from which they would greatly benefit, then government should abandon WTP.

In some contexts, this objection raises serious problems for neoclassical economics and for unambivalent enthusiasm for freedom of choice. But in the context of ordinary regulatory policy, this objection has more theoretical than practical interest. Typically we are speaking here of steps that would reduce low level mortality risks (say, 1/50,000) and here there is no reason to believe that the use of informed WTP (say, $100) is a product of adaptive preferences.

(b) Inadequate information and bounded rationality. A closely related objection would point to an absence of information and to bounded rationality. People have a notoriously difficult time in dealing with low-probability events.[117] If people are not aware of what they might be gaining by regulation, their WTP might be too low. And if people are unable to understand the meaning of ideas like "1 in 50,000," or to respond rationally to such ideas, then there are serious problems with relying on WTP. In imaginable circumstances, this is a serious difficulty for the use of WTP and VSL. Perhaps people's WTP reflects excessive discounting of future health benefits; if workers are ignoring the future, or applying an implausibly high discount rate, then there is a good argument for putting their WTP to one side.

By hypothesis, however, there is no such problem here. We are dealing with cases in which WTP is a result of adequate information and in which bounded rationality is not leading people to err. In any case the relevant numbers come from contingent valuation

[114] See George A. Akerlof, An Economic Theorist's Book of Tales 123-37 (1984).
[115] Daniel T. Gilbert & T.D. Wilson, Miswanting, *in* Thinking and Feeling: The Role of Affect in Social Cognition 178 (Joseph P. Forgas ed., 2000); Timothy D. Wilson & Daniel T. Gilbert, Affective Forecasting, Advances in Experimental Social Psychology, June 2003, at 345.
[116] For general discussion, see Daniel Kahneman, A Psychological Perspective on Economics, 93 Am. Econ. Rev. (Papers & Proc.) 162 (2003); Daniel Kahneman et al., Back to Bentham? Explorations of Experienced Utility, 112 Q.J. Econ. 375, 379–80 (1997).
[117] The literature on this point is vast. For overviews, see Jolls et al., supra note; Cass R. Sunstein, Probability Neglect: Emotions, Worst Cases, and Law, 112 Yale L.J. 61 (2002).

studies or market evidence in which decisions are adequately informed. If not, appropriate adjustments should be made.

(c) Rights. A quite different objection would point to people's rights. Perhaps people have a right not to be subjected to risks of a certain magnitude, and the use of WTP will violate those rights. And it does seem fully reasonable to say that whatever their WTP, human beings should have a right not to be subject to risks above a particular level. Imagine, for example, that poor people live in a place where they face a 1/20 annual risk of dying from water pollution; it makes sense to say that the government should reduce that risk even if people are willing to pay only $1 to eliminate it and the per-person cost is $100.[118]

As an abstract claim about people's rights, the objection is entirely correct. Something has gone badly wrong if people are exposed to serious risks and if their WTP prevents them, and is invoked to prevent their government, from doing anything in response. It would be foolish to suggest that WTP is determinative of the appropriate use of government subsidies; a redistributive policy hardly tracks people's WTP. (Would it make sense to say that government will give poor people a check for $100 only if they are willing to pay $100 for the check?) And in many cases people are subject to risks whose magnitude is indeed a violation of rights. But this point has little force against the particular argument I am making. The initial problem is that in the cases under discussion, rights of this kind are usually not involved; we are speaking here of statistically small risks. Suppose that this response is unconvincing and that rights are indeed involved. If so, there is a still more fundamental point. When rights are involved, the proper response is not to force people to buy protection that they do not want, but to provide a subsidy that will give them the benefit for free or enable them to receive the benefit at what is, for them, an acceptable price.[119] Nothing here is meant to deny the possibility that government should provide certain goods via subsidy, or indeed that subjection to risks above a certain level is a violation of rights.[120] The question here is

[118] I bracket the possibility that rights are resource-dependent and simply assume here that risks above a certain level should count as violative of rights.

[119] I put to one side the question whether people should be given in-kind benefits or instead lump sums.

[120] There is s separate question, not addressed here, whether and when subjection to risks of harm (as opposed to actual harm) is itself a harm. See Matthew Adler, Risk, Death and Harm: The Normative Foundations of Risk Regulation, 87 Minn. L. Rev. 1293 (2003).

one of regulation under the stated assumptions. So long as that is the question, use of WTP does not violate anyone's rights.

(d) Democracy vs. markets. An independent objection would stress that people are citizens, not merely consumers; it would urge that regulatory choices should be made after citizens have deliberated with one another about their preferences and values.[121] The argument against forced exchanges treats people as consumers; it sees their decisions about safety as the same as their decisions about all other commodities. For some decisions, this approach is badly misconceived.[122] Our constitutional system is a deliberative democracy,[123] not a maximization machine, and many social judgments should be made by citizens engaged in deliberative discussion with one another rather than by aggregating the individual choices of consumers.[124]

In the context of racial and sex discrimination, for example, the legal system does not aggregate people's WTP; the level of discrimination is not set by using market evidence or contingent valuation studies to see how much people would be willing to pay to discriminate (or to be free from discrimination). So too, the prohibition on sexual harassment does not emerge from asking anything about WTP. Through political processes, citizens have decided that certain forms of discrimination are illicit, whatever people's WTP. The protection of endangered species might be understood in similar terms. On reasonable assumptions, it would make little sense to aggregate people's willingness to pay in deciding in deciding whether and when to protect members of endangered species; this is a moral question to be resolved through democratic discussion, not through exercises in consumer sovereignty. The question of animal welfare is closely analogous. Laws that forbid cruelty to animals, and that impose affirmative duties of protection on human beings, stem not from anything involving WTP, but from a belief that moral commitments call for them.[125] Thus Amartya Sen emphasizes that "discussions and exchange, and even political arguments, contribute to

[121] See Elizabeth Anderson, Value in Ethics and Economics (1993); Ackerman and Heinzerling, supra note.
[122] See Anderson, supra note.
[123] See William Bessette, The Mild Voice of Reason (1994).
[124] See the discussion of "government by discussion" in Amartya Sen, Rationality and Freedom 287-89 (2001).
[125] See Gary Francione, An Introduction to Animal Rights (2001).

the formation and revision of values,"[126] and urges that in the particular context of environmental protection, solutions require us "to go beyond looking only for the best reflection of existing individual preferences, or the most acceptable procedures for choices based on those preferences."[127]

These claims are both fundamental and correct; they point to some serious limitations on the use of WTP for purposes of policy. But it is important not to read such objections for more than they are worth. In trading off safety and health in our own private lives, we do not have static values and preferences. Much of the time, our choices are a product of reflection, even if we are simply acting as consumers. Reflection and deliberation, including reflection and deliberation with others, is hardly absent from the market domain. To be sure, moral questions are not to be resolved by aggregating private willingness to pay. Sometimes people's preferences, even though backed by WTP, are morally off-limits, and policy should not take account of them. In addition, people are sometimes unwilling to pay a great deal for goods that have strong moral justifications; animal welfare is an example. In these circumstances, the market model is inapplicable.

But do these arguments suggest that government should override individual choices about how much to spend to eliminate low-level risks, even when those choices are adequately informed? For environmental protection generally, it is indeed important to go beyond "the best reflection of existing individual preferences." But this point does not mean that people should be required to pay (say) $100 to eliminate mortality risks of 1/100,000 when they are willing to pay only $75. If people's WTP reflects an absence of information or insufficient deliberation, then it is important for other people, in government as elsewhere, to draw their attention to that fact. And in some cases, a low WTP might be overridden on the ground that it is rooted in errors, factual or otherwise. But these points should not be taken as a general objection to governmental reluctance to force people to reduce statistical risks at an expense that they deem excessive. Here is one way to understand the argument I am making: Ours is a deliberative democracy, to be sure, but in that democracy, it is valuable for regulators to consider more fully individuated VSLs in deciding how to proceed, at least under the stated assumptions.

[126] Sen, supra note, at 287.
[127] Id. at 289.

(e) Very low probabilities and catastrophic risks. Suppose that everyone in the United States faces an annual death risk of 1/10,000,000—and that the risk, if it comes to fruition, will kill every person in the country. The expected number of annual deaths is 26, which would produce expected annual costs in excess of $158 million, assuming a VSL of $6.1 million. But if we attempt to elicit each individual's WTP to avoid a risk of 1/10,000,000, we might well produce a number very close to zero—yielding both 26 expected annual fatalities and expected annual costs very close to zero. This seems to be an anomaly; is it really sensible to conclude that the prevention of 26 deaths is worth nothing? A fully ex ante perspective, based on people's WTP to avoid very low probability risks, suggests an affirmative answer. But assigning a value near zero, for the prevention of dozens of deaths, seems quite implausible. In cases of this kind, we seem to find a serious problem with the ex ante perspective on VSL.

This conclusion understates the problem. In the case at hand, the risk is potentially catastrophic; if the 1/10,000,000 chance comes through, every American will be dead. Even if people show a WTP near zero to avoid a risk of that size, it does not seem right to think that the nation should spend almost nothing to prevent it.[128] The point has a general bearing on precautions against low probability risks of catastrophe: Some degree of prevention is justified even if WTP numbers do not justify them. Part of the problem with those numbers is that if individual behavior is consulted, it will not reflect a "catastrophe premium" or "extermination premium" that would almost certainly emerge if it were possible to test for it. But part of the problem may be that WTP is not an adequate measure of social responses to catastrophes, perhaps because people are not familiar with making choices about risks of that sort.

I believe that this is a sound objection to the use of a (low or near-zero) VSL in the context of catastrophic risks, even if the WTP numbers justify that VSL. But this is an extremely limited objection; it does not apply to the overwhelming number of cases in which VSL is used.

(f) Third party effects. A final objection would point to effects on third parties. If outsiders would be adversely affected, and if their welfare is not being considered, then the WTP calculus is seriously incomplete. This point creates a general and badly

[128] See Richard Posner, supra note.

neglected problem for WTP as it is currently used: Agencies consider people's WTP to eliminate statistical risks, without taking account of the fact that others—especially family members and close friends—would also be willing to pay something to eliminate those risks. John might be willing to pay $25 to eliminate his own risk of 1/100,000, but his wife Jane might be willing to pay $25 to eliminate John's risk too; if we add the WTP, on John's behalf, of John's friends and relatives, the total WTP might soon exceed $100. This point is a real problem for existing uses of WTP.

But we are stipulating that there are no third party effects here. The argument for using WTP, on the stated assumptions, is that government should not force people to buy goods that are not worthwhile for them. At least at first glance, this argument seems sound with respect to statistical risks of the kind on which I am focusing here.[129]

B. WTP and Easy Cases: Demographic Differences, International Differences

1. Rich and poor. Suppose that poor people are willing to pay only $20 to eliminate a statistical risk of 1/100,000, but that wealthy people are willing to pay $60. It would follow that the VSL would be lower for poor people than for wealthy people—and that a regulatory policy that focuses on WTP would provide a higher VSL for wealthy people ($6 million) than for poor people ($2 million). Is this unjust or unfair to poor people? On the current assumptions, it is not. Government should not force poor people to buy more than their WTP to eliminate statistical risks; forced exchanges of this kind do poor people no good and some harm. It is tempting to justify a uniform VSL, one that does not distinguish between rich and poor, on the ground that it embodies a form of risk equity, treating every person as no more and no less than one[130] and redistributing resources in the direction of poor people. But this is an error. A uniform WTP, taken (let us suppose) from a population-wide median, does not produce redistribution toward the poor, any more than any other kind of forced exchange. Government does not require people to buy Volvos, even though Volvos would reduce statistical risks. If government

[129] Note that the argument would not apply to risks faced by nonhuman animals; in that event, people's WTP could not tell the whole story.

[130] See Frank Ackerman and Lisa Heinzerling, Priceless: On Knowing the Price of Everything and the Value of Nothing (2003).

required everyone to buy Volvos, it would not be producing desirable redistribution.[131] A uniform VSL has some of the same characteristics as a policy that requires people to buy Volvos.

2. Rich countries, poor countries. The point has significant implications for global risk regulation. I have suggested that people in poor nations show a lower VSL than people in wealthy nations.[132] Building on evidence of this kind, some assessments of the effects of global warming find far higher monetized costs from deaths of people in rich countries than from deaths of people in poor countries.[133] In its Second Report in 1995, the International Panel on Climate Change calculated that a life in an industrialized country was worth $1.5 million, while a life in a developing country was worth only $150,000.[134] These assessments have been highly controversial; John Broome, for example, notes that under this approach, an American life is worth 10 or 20 Indian lives, a judgment that he deems "absurd."[135] Hence some analysts, including the International Panel, have opted for a world-wide VSL of $1 million, a choice that seems quite arbitrary and potentially harmful to people in rich nations and poor ones alike. The problem raises important dilemmas.

a. Abstract values? How should global institutions assess the monetary value of human lives? What are the monetized costs of (say) 10,000 worldwide deaths from global warming, deaths that include (say) 8000 people from poor countries and 2000 from

[131] Of course it is sometimes desirable for government to create "safety floors," for automobiles and other consumer goods, in part as a response to an absence of adequate information in the market. But such floors should not be seen as a redistributive tool, simply because they are not likely to produce good redistribution. See Susan Rose-Ackerman, Progressive Law and Economics, 97 Yale LJ 1083 (1989).

[132] See note supra.

[133] See http://www.ipcc.ch/pub/reports.htm

[134] See id.

[135] See John Broome, Cost-Benefit Analysis and Population, 29 J Legal Stud 953, 957 (2000), noting that that this conclusion is a product of what Broome rejects, "a money-metric utility function to represent a person's preferences. " Id. (In the easy cases, I suggest that a money-metric utility function is not absurd, and it is not quite that in the hard cases either; see below.) See also the discussion of the International Panel on Climate Change, Climate Change 2001, available at http://www.grida.no/climate/ipcc_tar/wg3/302.htm: "The VSL is generally lower in poor countries than in rich countries, but it is considered unacceptable by many analysts to impose different values for a policy that has to be international in scope and decided by the international community. In these circumstances, analysts use average VSL and apply it to all countries. Of course, such a value is not what individuals would pay for the reduction in risk, but it is an 'equity adjusted' value, in which greater weight is given to the WTP of lower income groups. On the basis of EU and US VSLs and a weighting system that has some broad appeal in terms of government policies towards income distribution, Eyre *et al*. (1998) estimate the average world VSL at around 1 million Euros (approximately US$1 million at 1999 exchange rates)."

wealthy ones? The discussion thus far suggests that there is no sensible abstract answer to these questions; we have to know what, in particular, the answer is for. If a general question is asked, outside of any particular context, about the monetary value of a stated number of deaths in 2020, it is best unanswered (except perhaps with laughter). The appropriate assessments of VSL, and variations across countries, depends on their intended use. If disparate numbers are meant to identify the actual monetary values of human lives, and to suggest that people in Canada are "worth" much more than people in Argentina or that poor people are "worth" less than rich ones, they are ludicrous as well as offensive.

We can go further. If the disparate numbers are meant to suggest the appropriate amount that donor institutions should spend to reduce mortality risks, they make little sense. The fact that a poor person in a poor nation would be willing to pay $1 to eliminate a risk of 1/10,000, whereas a wealthy person in a wealthy nation would be willing to pay $100, cannot plausibly be used to defend the view that an international agency should devote its resources to the latter rather than the former. To see the point, suppose that you are asked to choose between two programs:

(A) Program A would eliminate (at a stated cost to you of $500) a 1/10,000 risk faced by fifty poor people in Costa Rica, each willing to pay $2 to eliminate that risk.

(B) Program B would eliminate (also at a stated cost of $500) a 1/10,000 risk faced by fifty wealthy people in Berlin, each willing to pay $350 to eliminate that same risk.

In principle, there is no reason to think that you should prefer to save the Berliners, even those their VSL is far higher. In fact Program A has much higher priority, because it would help people who are facing extreme deprivation. What is true at the individual level is true across nations as well.

(b) VSL in poor countries. But imagine that the government in a poor nation is deciding on appropriate policy to reduce workplace risks. At least under the assumptions I have given thus far, such a government would do well to begin by using the admittedly low WTP of its own citizens. If citizens in that nation show a WTP of $2 to eliminate risks of 1/10,000, then their government does them no favors by requiring them to pay

$50 or $10. This is the sense in which VSL properly varies across nations, and in which citizens of poor nations have a lower VSL than citizens of wealthy ones. The point has strong implications for international labor standards. It is tempting to suggest that workers in poor countries, for example China and India, should receive the same protection as those in the United States; why should a worker in Beijing be subject to significantly higher death risks than a worker in Los Angeles?

As a matter of basic principle, there is no good answer to this question. But as a matter of regulatory policy, the answer is straightforward. So long as the distribution of global income has the form that it does, a system that gives Chinese workers the same protection as American workers is not in the interest of Chinese workers—assuming, as we are, that the cost of that protection is borne by workers themselves. Requiring Chinese workers to have the same protection as Americans amounts to a forced exchange on terms that Chinese workers reject. The idea that workers in poor nations should have the "same" protection as workers in wealthy nations is an error, rooted in a moral heuristic involving the equal worth of all human lives—a heuristic that sometimes works well but that also misfires.[136]

Note, once again, that the argument for using WTP does not imply satisfaction with the existing distribution of wealth. We might believe that the existing distribution is unjust and that it should be dramatically changed. The problem with forced exchanges is that they do nothing to alter existing distributions. In fact they make poor people worse off, requiring them to use their limited resources for something that they do not want to buy.

C. Harder Cases: Kaldor-Hicks and Welfare

There is an obvious artificiality in the assumptions thus far. Most important, people do not always bear the full social costs of the regulatory benefits they receive. Sometimes they pay only a fraction of those costs—or possibly even nothing at all. When this is so, the normative analysis is much more complicated. In the context of air pollution regulation, for example, there is a complex set of distributional effects, and on balance, poor people, and members of minority communities, appear to be net gainers.[137]

[136] On moral heuristics in general, see Cass R. Sunstein, Moral Heuristics, Minn L Rev (forthcoming 2004).
[137] See Matthew E. Kahn, The Beneficiaries of Clean Air Act Regulation, 24 Regulation 34 (2001).

An efficiency analysis, based on WTP, might not produce an adequate account of the welfare effects of air pollution regulation. And even if it does, an account of welfare effects might not end the normative question, because the distributional gains are important to consider.[138] The difficulty is that a high VSL, one that exceeds what WTP studies show for poor people, might produce outcomes that are in the best interest of poor people, in the sense that the result is a welfare improvement for them.[139] Note that these points do not bear directly on the question whether VSL should vary across risks. But they do bear on the issue of varying VSL across persons, and in particular across differences that result from disparities in income and wealth.

Suppose, for example, that beneficiaries of a proposed drinking water regulation are willing to pay only $80 to eliminate a risk of 1/80,000 in drinking water; that the per-person cost of eliminating a 1/50,000 risk is $100; but that for every dollar of that cost, the beneficiaries pay only 80 cents. The remaining 20 cents might be paid by water companies themselves, in the form of reduced profits, or by employees of the water companies, in the form of reduced wages and fewer jobs. In this example, the costs of the regulation exceed the benefits; it is inefficient. But by hypothesis, the regulation makes its beneficiaries of the regulation better off. If the WTP criterion is used, the fact that the monetized costs exceed the monetized benefits is decisive. But as a normative matter, the analysis here is far harder than in the easy cases. On what assumption should the WTP numbers be decisive?

The assumption must be that economic efficiency is the goal of government, at least in the context of regulation—that in order to know what to do, we should aggregate the benefits and costs of regulation, and act if and only if the benefits exceed the costs. When using the WTP numbers, government is acting as a maximization machine,

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[138] The Office of Management and Budget has expressly recognized this point in its most recent guidelines governing regulatory impact analysis. See 2003 Report to Congress at 131: "Those who bear the costs of a regulation and those who enjoy its benefits often are not the same people. . . . Your regulatory impact analysis should provide a separate description of distributional effects (i.e., how both benefits and costs are distributed among sub-populations of particular concern) so that decision makers can properly consider them along with the effects on economic efficiency."

[139] For relevant discussion, see Christine Jolls, Accommodation Mandates, 53 Stan. L. Rev. 223 (2000). Jolls argues that accommodation mandates might produce desired redistributive gains whether or not they are efficient, and she supplies a detailed analysis of when those gains are most likely to occur. At present, there is no parallel discussion for regulation of the sort I am discussing here. My suggestion is that under imaginable assumptions, some such regulation will be defensible on distributive grounds.

aggregating all benefits and costs as measured by the WTP criterion. But this is a highly contestable understanding of what government should be doing. In fact it represents a shift from the relatively uncontroversial Pareto criterion, exemplified above, to a version of the far more controversial Kaldor-Hicks criterion,[140] which assesses policy by asking this question: Are the gainers winning more than the losers are losing? The Kaldor-Hicks criterion is sometimes described as potential Pareto superiority,[141] because it asks whether in principle, the winners could compensate the losers, and a surplus could be left over. The difficulty of course is that Pareto superiority is merely potential. Some people really are losing and others are gaining.

In the harder cases, the gainers are gaining less (in monetary terms) than the losers are losing—and hence the regulation is said to be unjustified. Under the assumptions I have given, the regulation is indeed inefficient: Its social cost is higher than its social benefit. But is the regulation undesirable? This is not at all clear. The first problem is that WTP is measuring gains and loses in monetary terms, rather than in welfare terms.[142] It is possible that those who gain, in the harder cases, gain more welfare than the losers lose; WTP is not dispositive on that question. The second problem is distributional. Suppose that in terms of overall welfare, the regulation is not desirable; it makes aggregate welfare lower rather than higher. But suppose too that those who benefit are more advantaged than those who lose. If, for example, those who are willing to pay $80 are disproportionately poor, and those who pay the remainder are disproportionately wealthy, the regulation might be plausibly justified despite the welfare loss.

It is natural to respond here that if redistribution is what is sought, then it should be produced not through regulation but through the tax system, which is a more efficient way of transferring resources to those who need help.[143] I agree. But suppose that

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[140] It is only a version of that criterion, because it is measuring welfare in monetary equivalents. A direct assessment of welfare, if it were possible, might show that the regulation in question is justified on Kaldor-Hicks grounds.

[141] See, e.g., Richard Posner. Economic Analysis of Law 14 (4th ed. 1992) ("The Kaldor-Hicks concept is also and suggestively called potential Pareto superiority: The winners could compensate the losers, whether or not they actually do.").

[142] On the direct measurement of welfare, see Daniel Kahneman, forthcoming.

[143] See, e.g., Louis Kaplow & Steven Shavell, Why the Legal System is Less Efficient Than the Income Tax in Redistributing Income, 23 J. Legal Stud. 667, 667 (1994) ("[R]edistribution through legal rules offers no advantage over redistribution through the income tax and typically is less efficient."); Steven Shavell, A Note on Efficiency vs. Distributional Equity in Legal Rulemaking, 71 Am. Econ. Rev. (Papers & Proc.) 414, 414 (1981) (describing how income tax can compensate for inefficient liability rules and

redistribution is not going to happen through the tax system. If so, then the regulation in the harder cases cannot be ruled off-limits despite its inefficiency.

Return finally to the use of VSL in poor nations in the regulatory context that is my principal focus here. Suppose that in such nations, VSL turns out to be $100,000. If relevant governments use a VSL of $6 million, on the theory that their citizens should not be valued less than those of wealthy nations, social harm will almost inevitably result. In the easy cases, the forced exchanges will be ludicrously harmful to the people they are supposed to help. In the hard cases, where the beneficiaries pay only a fraction of the cost, such a nation will be spending far too much of its money on risk reduction (or more precisely, on reducing the risks that happen to get onto the regulatory agenda). The inefficiency of an extremely high VSL will be felt acutely and in many forms, including decreased employment. But if the costs of risk reduction will be paid by third parties—for example, wealthy nations—then the people in that poor country will be helped even if risk reduction is based on an excessive VSL.

Of course they would almost certainly be helped more if they were given cash (supposing that it would not be squandered) rather than in-kind benefits. But if cash redistribution is not possible, regulatory benefits, provided for free or for a fraction of their cost, remain a blessing. If, for example, a global institution uses a world-wide VSL of $1 million, and if that amount exceeds the domestic VSL of people in poor nations, it is possible that poor people will gain a greater deal if the resources for risk-reduction are provided by wealthy nations. In the harder cases, the simple point is that many of the intended beneficiaries of regulation are in fact net gainers.

D. Harder Cases as Easy Ones, and VSL Again

Is there a reason to treat the harder cases as identical to the easy ones? Is this absurd[144]? Agencies do not distinguish between them, although recent guidelines, calling

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redistribute income); David A. Weisbach, Should Legal Rules Be Used to Redistribute Income?, 70 U. Chi. L. Rev. 439, 439–40 (2003) ("[T]he tax system is a better tool for redistribution of income than legal rules.").

[144] See Broome, supra note, at 121. Broome urges that "there are separate reasons why preferences are an unsatisfactory basis for valuing lives," including the fact that "in contexts involving risks, people's preferences are generally muddled and incoherent" rather than rational. Id. at 122. If preferences are in fact muddled and incoherent, current practice is of course on thin ground.

agencies to attend to distributional issues, might eventually encourage them to do so.[145] A possible reason for treating the harder cases as the easy ones is optimistic: Perhaps everything will balance out in the end. Perhaps no group will be systematically helped or hurt, and the tax system will be used to produce appropriate redistribution. In the real-world domestic cases, we might also think that a direct inquiry into welfare, bypassing WTP, would be extremely difficult or perhaps even impossible to operationalize. If distributional considerations are deemed relevant, interest-group warfare might be the consequence, rather than distribution to those who particularly need and deserve help.[146] More modestly, we might conclude that agencies should generally pursue efficiency, using VSL as the foundation for decisions, but should allow distributional findings to cut the other way in cases in which there is compelling reason to allow them to do so. In fact this approach is a plausible way of reading OMB's current guidelines on regulatory impact analysis.[147]

Let us return in this light to VSL. In the easy cases, the resulting redistribution is almost certainly perverse, because forced exchanges, under the stated assumptions, are highly likely to harm the people who are being coerced. But in the harder cases, it cannot be said that the beneficiaries of regulation will be harmed if government uses a number that exceeds their actual VSL. Everything depends on the distributional effects of the regulation. If the beneficiaries are well-off, a high VSL might produce perverse redistribution if those who lose are toward the bottom of the economic ladder. We could imagine this result, for example, with a pollution program that protects those who visit expensive recreational areas. If the beneficiaries are poor, and if the costs are born by the wealthy or more generally, a high VSL might be in the interest of those who need help. Air pollution programs, providing special protection for those in cities, appear to be an example.[148] We can therefore reject the confident view of economically inclined analysts who believe that accurate VSLs, based on actual WTP (and hence individuated), should always be the basis of regulatory policy. But we can also reject the confident view of

[145] See note supra.
[146] See Viscusi, supra note.
[147] See note supra.
[148] See Kahn, supra note.

skeptics who believe that a uniform WTP, refusing to make distinctions among persons, is best on distributive grounds.

What are the implications for individuation of VSL? It remains true that according to the theory that underlies agency valuations, a higher degree of individuation would be desirable. It also remains true that with respect to risks, individuation is appropriate insofar as valuations differ depending on the nature of the risk at stake. The principal qualification is that a uniform VSL, one that gives disadvantaged people regulatory protection in excess of their WTP, might turn out to have fortunate distributional consequences in the harder cases. We should be careful about this point. It will not always hold, and if the goal is to provide more assistance to those in need, a uniform VSL is hardly the best way to achieve that goal. Consider the case of poor nations: a worldwide VSL, adopted by each nation, of $6.1 million would almost certainly be harmful, simply because the resulting levels of regulation would have such adverse effects on wages and employment levels. (In these circumstances it is unsurprising that workers in wealthy nations, not in poor ones, often clamor the loudest for greater protection of workers in poor nations; workers in wealthier nations would be the principal beneficiaries of such regulation, which would protect them against competition from those in poorer nations.) My only point is that in some cases, individuation across persons will produce worse outcomes on distributional grounds and possibly on grounds of welfare as well.

How, then, should global institutions, like the International Panel on Climate Change, assess the monetary costs of risks faced by people all over the world? As I have suggested, the answer turns on the purpose of the assessment—on what issue the answer is supposed to be addressing. There is no good acontextual way of deciding on the aggregate costs of global climate change by 2050; actually that is a ludicrous question, because it does not (as stated) have any point. A far more sensible question is whether it would make sense for any particular nation to accept a particular way of responding to the problem, such as the Kyoto Protocol.[149] At the national level, an assessment of the

[149] See William Nordhaus and Joseph Boyer, Warming the World: Economic Models of Global Warming 168 (2000): "Finally, the Kyoto Protocol has significant distributional consequences. . . . The lion's share of the costs are borne by the United States. Indeed, the United States is a net loser while the rest of the world on balance benefits from the Kyoto Protocol."

costs and benefits of the Kyoto Protocol is not much different from an assessment of the costs and benefits of any other regulation. If the risk of death, as a result of climate change, is in the neighborhood of 1 in 100,000, then the ordinary framework applies, with appropriate individuation across both risks and persons.[150] For wealthy nations, the argument for signing the Kyoto Protocol is strengthened by the fact that the harms of global warming will be felt disproportionately in poor nations,[151] and also by the fact that wealthy nations have done by far the most to produce the situation that makes global warming a serious problem. An analysis of these questions would make it necessary to go far beyond the present topic. My goal here has been to suggest that within nations, diverse VSL are perfectly sensible, and that answers to questions about valuation must be closely attuned to the purposes for which those questions are being asked.

Conclusion

The theory that animates current valuations of mortality risks argues in favor of far more individuation. A uniform VSL cannot possibly cut across all risks and all individuals. Does the risk involve cancer? What kind of cancer? Does it involve air pollution or driving on the highways? It is obtuse to adopt an approach that values all statistically equivalent mortality risks in the same way. In addition, individuals display a great deal of heterogeneity in their VSL—not simply because of different tastes and values, but also because of different levels of income and wealth. Willingness to pay depends on ability to pay. Nothing I have said here is meant to suggest approval of existing distributions of resources. Of course poor people are not "worth less" than wealthy ones, and it is often appropriate for government to provide resources directly to poor people or instead to subsidize the provision of regulatory benefits. But forced exchanges are not a good way to assist poor people, and a uniform VSL is often a perverse response to inequality. In theory, risk reduction policies should be more fully individuated, giving each person regulatory protection that corresponds to his WTP for the particular risk in question.

[150] See generally id.
[151] See id.

Of course this is not practicable. Government lacks the necessary information about individual risk preferences; categorical judgments are inevitable. In any case many of the benefits provided by regulation are collective in character. Regulators cannot feasibly provide protection to one person without simultaneously providing protection to many. But it is nonetheless important to see what the current theory counsels in principle, and to understand that the limitations are practical ones, some of which might be overcome as knowledge progresses. And even with the practical limitations, a uniform VSL is increasingly difficult to justify.

We know enough to know that some risks produce a higher VSL than others—a judgment that would produce significantly different analyses in many cases, above all by producing a higher VSL for cancer risks. A program that protects old people will produce a lower VSL than one that protects younger people, and there is no ethical objection to variations on the basis of age.[152] And if a program affects mostly wealthy people, a VSL based on the population-wide median will be too low. It would follow that the Federal Aviation Administration should have a relatively high VSL, because people who fly are wealthier than the population median—and when the EPA is engaging in cost-benefit analysis for programs protecting poor people from risks associated with hazardous waste sites, it should have a relatively low VSL.

The principal qualification here is that when the beneficiaries of regulation do not pay all of its cost, a high VSL may actually be in their interests. The easy cases, in which the beneficiaries are forced to pay for regulatory benefits, are not the same as those in which they pay only a fraction of the cost. Nonetheless, current practice treats them as identical, perhaps because of the great difficulty in untangling the incidence of regulatory benefits and costs. My goal has not been to resolve that difficulty, but to suggest that the theory behind current practice justifies far more individuation of VSL than regulators currently provide. However we deal with distributional problems and the hardest cases, the use of a uniform VSL is unacceptably obtuse.

[152] See Aldy and Viscusi, supra; Sunstein, supra. I am putting to one side the difficult questions raised by the need to produce a VSL for children.

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