

Russell, Louise B.

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# Do We Really Value Identified Lives More Highly Than Statistical Lives?

*Louise B. Russell, PhD*

In 1968, in a paper about valuing ways to reduce the risk of death, Thomas Schelling<sup>1</sup> distinguished between “identified lives” and “statistical lives.” Identified lives are the miners trapped in a mine or the child with a terminal disease—specific people who need help now. Statistical lives are those people, unidentifiable before the fact and often after as well, who will be saved by a new safety regulation, public health program, or environmental standard. Schelling observed that people seem to be willing to pay more to save an identified life: “Let a six-year-old girl with brown hair need thousands of dollars for an operation that will prolong her life until Christmas, and the post office will be swamped with nickels and dimes to save her. But let it be reported that without a sales tax the hospital facilities of Massachusetts will deteriorate and cause a barely perceptible increase in preventable deaths—not many will drop a tear or reach for their checkbooks.”<sup>1</sup>

The distinction has been accepted as self-evident ever since. Each of us can point to situations in which thousands or millions of dollars were spent to save an identified life. Such large numbers are readily accepted as incompatible with the sorts of decisions that we make every day, and that governments make on our behalf, about avoiding less dramatic risks.

They suggest that we may have different decision rules—rules that are at odds with each other and that lead, for example, to valuing a known sick child more highly than a program that would save an unknown sick child.

Does it matter that there are 2 different rules? The possibility has led to some unease over the use in decision making of cost-benefit and cost-effectiveness analyses, which are very much in the business of estimating the statistical lives saved by different medical and public health interventions. Cost-benefit analysis values statistical lives directly in monetary terms. When a threshold cost-effectiveness ratio is used to help choose interventions, cost-effectiveness analysis implies that all life-years, or quality-adjusted life-years, are more or less equally valuable.

Should decisions supported by cost-benefit or cost-effectiveness analysis be modified to reflect these possibly different valuations? If so, which decisions? What is the justification for different valuations for known and unknown lives? Considerable thought has gone into trying to differentiate the 2 situations and ensure that valuations appropriate for one are not mistaken for valuations appropriate to the other.<sup>2,3</sup> The National Institute for Health and Care Excellence (NICE) in the United Kingdom has defended its choice not to consider what NICE terms the “rule of rescue” when recommending services for coverage by the National Health Service (NHS)<sup>4</sup>:

When there are limited resources for healthcare, applying the ‘rule of rescue’ may mean that other people will not be able to have the care or treatment they need. NICE recognises that when it is making its decisions it should consider the needs of present and future patients of the NHS who are anonymous and who do not necessarily have people to argue their case on their behalf. NICE considers that the principles provided in this document are appropriate to resolve the tension between the needs of an individual patient and the needs of present and future users of the NHS. The Institute has not therefore adopted an additional ‘rule of rescue.’

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Address correspondence to Louise B. Russell, Institute for Health and Department of Economics, Rutgers University, 112 Paterson Street, New Brunswick, NJ 08901; telephone: (848) 932-6507; e-mail: lrussell@ifh.rutgers.edu.

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At the time Schelling published his essay, economists valued statistical lives at the present value of the future earnings that individuals with those characteristics could expect—the “human capital” approach. Several economists, including Drèze, Schelling, and Mishan, argued that this was wrong.<sup>5</sup> They reasoned that life-saving should be valued at what people affected by the intervention would be willing to pay, not by their discounted future earnings. By 1985, Jones-Lee<sup>5</sup> could report that the case for willingness to pay—the concept “that social decisions should, so far as possible, reflect the interests, preferences and attitudes to risk of those who are likely to be affected by the decisions”—had been “extensively developed in the literature.” More than that, it was accepted as a better way to think about valuing life-saving.

Empirical research on willingness to pay for life-saving programs and policies grew rapidly. Two primary methods are used to estimate what is now called the value of a statistical life (VSL): revealed preference and stated preference.<sup>3,6</sup> Revealed preference infers people’s willingness to pay to reduce the risk of death—to save a statistical life—by analyzing market transactions, such as the wage differential people receive to compensate them for higher risk of death on the job<sup>3,6,7</sup> or the prices they pay for safety equipment that reduces the risk of death.<sup>8</sup> Revealed preference has the advantage that market transactions represent real choices: People were actually paid for higher occupational risk or they actually paid others for goods and services to reduce risk. Stated preference is based on surveys: People are asked to estimate what they would be willing to pay to save lives in various hypothetical situations. The method can be used in situations where revealed preference is possible as well as for choices that are not reflected in market transactions.

The US Environmental Protection Agency (EPA) began using VSL estimates to value lives saved by environmental standards in the mid-1980s.<sup>9</sup> A review published in 2013 reported that there were “well over a hundred VSL studies.”<sup>3</sup> Based primarily on wage-risk studies, EPA currently values a statistical life at \$7.4 million (2006 dollars), the US Department of Transportation at \$6.2 million (2011 dollars), and the Canadian Treasury at \$6.1 million (2004 Canadian dollars). Despite fears that the hypothetical nature of the questions would lead respondents to give higher values, stated preference studies tend to produce lower estimates.<sup>3,6</sup>

VSL estimates are much higher than discounted future earnings. Consider the comparison for middle-aged men. Grosse and others<sup>10</sup> report that

average future earnings for men aged 40–44, discounted at 3% per year, are \$1.1 million in 2007 dollars. A wage-risk study published in 2012,<sup>7</sup> designed to make full use of all that has been learned about the best way to do these studies, estimated values of \$4–\$10 million per life saved (2001 dollars) for a sample of employed men with an average age of 40. Using the Consumer Price Index to adjust the VSL estimates to 2007 raises the range to \$4.7–\$11.7 million, almost 5–12 times as large as future discounted earnings.

How do VSL estimates compare with willingness to pay for identified lives, as shown by highly publicized rescue efforts? Despite the wide range of VSL estimates and still-unresolved controversies about exactly what they do, and do not, measure,<sup>3,6,7</sup> this much is clear: VSL estimates are consistent with spending very large amounts on identified lives. Valuing statistical lives at willingness to pay, instead of at discounted future earnings, produces numbers much like the amounts people show they are willing to spend on identified lives. Consider Schelling’s example: VSL estimates imply that the value of a single year of life is in the hundreds of thousands of dollars,<sup>3</sup> which is quite consistent with donating “thousands of dollars to prolong the life of a 6-year-old girl with brown hair until Christmas,” even allowing for the increase in the price level since 1968.

As a recent, highly publicized, example, consider the estimated \$10–\$20 million spent to save 33 Chilean miners trapped by a mine cave-in in 2010.<sup>11</sup> That is the kind of impressive outlay that persuades people that identified lives are valued more highly than statistical lives. And the true value of all the resources used in the rescue is probably substantially higher since the estimate undoubtedly excludes the value of the time of the many volunteers in the effort.

Is that outlay at odds with what is spent on statistical lives? A few calculations suggest that it is not. To start, the average age of the trapped men was about 40, the same as in the Kniesner study.<sup>7</sup> Updating those estimates to 2010 brings the range of VSL to \$5–\$12 million for each life, or \$165–\$396 million for 33 miners. Life expectancies are almost identical in the US and Chile, and the rescue effort involved an industrial accident, the same sort of risk valued in wage-risk studies—2 factors analysts consider when deciding whether a VSL estimate derived in one setting can be transferred to another—but incomes in the 2 countries are quite different. If we adjust proportionately for the difference in per capita Gross Domestic Product,<sup>12,13</sup> the range would be \$61–\$147 million, still well above the rescue costs of \$10–\$20 million.

A VSL is a certainty equivalent, so we need to adjust further for the fact that it was a good deal less than certain that the miners could be rescued. The \$61–\$147 million range leaves plenty of room for adjustment. Even at the high end for total costs, \$20 million, and the low end for VSL, \$61 million, the probability of success could have fallen to 0.33 before the expected benefit—the willingness to pay to rescue the miners—just equaled the costs. The decision to spend \$20 million was not, however, irrevocably made at the outset. On the 17th day of the 69-day effort, rescuers made contact with the miners and discovered that all 33 men were alive and well.<sup>14</sup> From then on they were able to deliver supplies to them and update their information day by day—they were all still alive and well.

Another issue is the difference between willingness to pay to receive a benefit (WTP) and willingness to accept payment in return for giving it up (WTA)—the difference between being a buyer and a seller—an issue that has been discussed and studied for as long as VSL estimates have been made. Studies usually show that WTA is higher than WTP, often considerably higher.<sup>15</sup> Two primary reasons are proposed for the discrepancy: that people are averse to losses and value a loss more than a gain of the same amount, and that unlike WTP, WTA is not limited by income. Wage-risk studies would seem to be estimating WTA, the wage differential required to persuade a worker to accept higher risk, not WTP, so the apparent consistency of VSLs based on wage-risk studies with spending on identified lives might be due to this fact and not to a more general agreement between the valuations of statistical and identified lives.

Apparently the issue has been raised with the authors of the 2012 wage-risk study used above,<sup>7</sup> and they have responded with a paper whose title makes their view clear, “Willingness to Accept Equals Willingness to Pay for Labor Market Estimates of the Value of Statistical Life.”<sup>16</sup> In the paper they report regressions for job changers moving to riskier jobs, who should be deciding on the basis of WTA, and those moving to less risky jobs, who should be deciding on the basis of WTP. Their point estimates of the compensating wage differentials for the 2 groups are similar in some specifications, different in others, with WTA usually but not always greater than WTP, but the differences are not large. The authors conclude, “The average WTA amount is about 17% higher than the average WTP amount. Even if such discrepancies were to represent real differences, they would lead to only minor refinements

in the VSL.”<sup>16</sup> The confidence intervals for their estimates are very wide, however, so the issue cannot be considered resolved.

Of particular importance for the line of reasoning presented in this editorial, their WTP estimates are, after adjustment to the 2010 price level, all comfortably within the \$5–\$12 million range used above in the calculations for the Chilean miners.<sup>16</sup> The discrepancy they find between WTP and WTA arises because their WTA estimates are even larger. As further support for the reasonableness of the \$5–\$12 million range, many estimates of willingness to pay for safety equipment and safer cars, clearly WTP and not WTA, also fall in this range after adjustment to the 2010 price level, although toward the lower end.<sup>8</sup>

Adjustments and controversies aside, the evidence provided by VSL estimates suggests that people’s willingness to pay for statistical lives may be consistent with their willingness to pay for identified lives. The apparent existence of 2 different decision rules may have been no more than an artifact of the economic method for valuing statistical lives in use at the time the distinction was proposed. Now that economists’ methods more fully reflect “the interests, preferences and attitudes to risk of those who are likely to be affected by the decisions,” their estimates of the value of a statistical life support the idea that there just may be a single rule: Identified and unidentified lives may be equally valuable. This is good news for decision makers who use cost-benefit and cost-effectiveness analysis to inform decisions.

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