

# How Do You Compensate a Dead Person?

by

James D. Rodgers\*

## DRAFT – NOT TO BE QUOTED WITHOUT PERMISSION

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"The accumulating evidence suggests that life valuation should not be approached as a search for an elusive number. Even if we divine which marginal curves to cross, or if we conduct an income survey of motorcyclists, or if we see how much is spent to replace a heart valve, no irresistible answers can be expected. (p. 419); "...the context in which lives are being sacrificed or saved will affect both the procedures by which lives should be valued, and the valuations themselves." (p. 420); "Most analysts would agree that the appropriate value to be placed on a life depends on who is making the decision about the life, who would be paying to save it, and who would benefit if it were saved." (p. 422) (39, Zeckhauser, 1975)

### I. Introduction

This paper was stimulated by recent discussions in the Wall Street Journal (41, Dec. 22, 1988), Everett Dillman (12, 1988) and Robert Thornton and Eli Schwartz (33, 1987 and 34, 1987) of how "hedonic" measures of the "value of life" might be relevant for determining the appropriate degree of compensation in lawsuits involving wrongful death. In 1987, the U.S. Court of Appeals for the 7th circuit affirmed a decision in Sherrod vs. Berry, 629 F. Supp. 159, in the Northern District of Illinois, in which expert witness Stanley Smith testified that appropriate damages in a wrongful death case exceeded the traditional measures of lost earnings capacity and services. Based on Smith's testimony regarding Ronald Sherrod, a 19-year-old boy killed by a Joliet, Illinois police man, a jury awarded \$450,000 for loss of parental association, \$300,000 for financial loss to the estate, and \$850,000 to the estate for hedonic damages - the loss of life itself and the attendant pleasures of living. (However, the full Court of Appeals of the 7th Circuit has since reversed the original ruling in the Sherrod case.) The purpose of this paper is to examine the appropriateness, from a conceptual point of view, of the use of hedonic measures of the "value of life" as a guide to damages in cases of wrongful death. In Section II, I begin by reviewing two major alternative ways that the "value of life" is measured. Next, in Section III, I discuss very briefly the way damages are actually measured in wrongful death cases in the various state and federal courts. In Section IV, I delve into how such damages should best be defined. In Section V, I examine whether measures of the "value of life" based on willingness-to-pay for risk reduction provide appropriate guidance about the damages which should be awarded. Section VI contains some conclusions.

## II. Alternative Ways to Measure the "Value of Life"

In economics, the term "value of life" has little or nothing to do with matters relating to philosophy, religion or metaphysics. Rather, the term refers to a monetary measure derived using one of two general methods: the human capital (HC) method and the willingness-to-pay (WTP) method. By reference to a person's future earnings capacity (either net or gross of personal consumption), the HC method attempts to put a value on one aspect of life.<sup>1</sup> Because of this, Thomas Schelling (30, 1968) has argued that the HC method places a value not on a person's life but on his or her livelihood. In contrast, the WTP method derives a measure of the "value of life" from an individual's choices involving a risk of death.<sup>2</sup> If an individual would sacrifice an amount of money,  $dW$ , in exchange for a small reduction in the risk of death,  $dP$ , then according to the WTP approach, the person values his or her life at least as much as  $V = dW/dP$ . Some difficulties in interpreting  $dW/dP$  as the "value of life" are discussed below.

A major reason economists have been interested in the theoretical analysis and empirical measurement of the "value of life" is that many public policies change the risk of injury and death. Systematic cost-benefit analyses to assess the desirability of such policies requires a valuation of these risk changes. The WTP method is generally regarded as the correct conceptual procedure to value risk changes in a way that is compatible with (and can be added to) valuations of the other benefits and costs of the policy to arrive at an overall assessment of its desirability.<sup>3</sup> If one of the expected effects of a policy is the saving of  $L$  lives per year, then the WTP method of measuring of the value of the life can be used to estimate the value of the annual risk-reduction benefit as  $L \times (dW/dP)$ , where  $dW$  is the average affected person's willingness to pay and  $dP$  is the reduction in the probability of death that the policy is predicted to cause. The total risk-reduction benefit,  $L \times (dW/dP)$ , is equivalent to the benefit that would be found by multiplying the number of affected people,  $N$ , by the average  $dW$  of each, so long as  $L = dP \times N$ .

Different people may, of course, value differently a given reduction in the risk of death, and a given policy may reduce the risk of death by a different amount for different people. Hence, a more general formula for evaluating the benefit would be one that sums each affected person's  $dW$ . Such a procedure actually has two advantages over the one in the previous paragraph. First, it is more general and therefore always correct, and, second, it does not make use of the quotient,  $dW/dP$ , which is what gives rise to the idea that economists' efforts to measure the value of risk reduction has something to do with the total value a person places on his or her life. As I will argue below, any perceived gain that one thinks is derived from having each person's quotient, or an average quotient,  $dW/dP$ , rather than the sum of the  $dW$ s over all persons, is an illusion. So used, the "value of life"

concept is being stretched beyond its legitimate use.

A useful distinction may also be drawn between the value a person places on a risk reduction for himself or herself, and the value that the person places on the reduction in risk for others, such as family members. Joe might be thought of having an "own-dW"; beyond that, other people in Joe's family may also value a reduction in risk experienced by Joe, so that the total value of a reduction in the risk of Joe's death would be given by "Joe's-own-dW" plus the benefit others experience due to Joe's greater life expectancy, "the sum of others' dW for Joe." In evaluating the benefits of the policy that is causing a risk reduction, these external effects should be counted too. (25, Mishan, 1982, Chap. 46.)

In the "value of life" measure,  $dW/dP$ , it is usually assumed that  $dP$  is a small change in the risk of death. Where the risk change is large, the measure may not be defined. For example, most people would probably refuse to play Russian roulette regardless of the compensation offered, and the refusal rate could be expected to rise as the number of empty chambers in the six-shooter declined from five to zero. Of course, some people are (or have been!) willing to play this game, but these players are not likely to be regarded as "typical" or as having representative preferences.<sup>4</sup>

The exchange of money for a reduced risk of death (or vice versa) that people make as consumers and in the labor market has been investigated in many sophisticated empirical analyses and surveys.<sup>5</sup> One of the latest surveys of recent empirical work (14, Fisher, et al., 1988) put the range of estimates of the "value of life" implied by such choices between \$1.6 million and \$8.5 million. Quite aside from the merits of use of WTP measures in death cases, with numbers in this range, it is no great surprise that plaintiff's attorneys would be keenly interested in seeing WTP measures applied.

### **III. Actual Compensation for Wrongful Death**

In the United States, most states and the federal government use some variant of the HC approach in assessing damages in personal injury and death cases, taking a version of the HC approach broad enough to include the value of time spent in performing services at home. A departure from the HC method is permitted in the allowance of an award for pain and suffering. Michael Brookshire (7, 1987, Chapter 11) provides a useful summary of legal guidelines on damage calculations from wrongful death statutes and court decisions in the various states and at the federal level. In forty-three states, damages are assessed to provide compensation to the decedent's survivors. In seven states, damages provide compensation under a "loss to the estate" interpretation, where the basic theory is that the decedent, acting through his estate, should be compensated through a continuation (or survival) of the action the victim would have had, if the victim

(and/or the tortfeasor) had lived. Five of the forty-three states with compensation to survivors have "loss to the estate" compensation as well. In the federal statutes, such as the Federal Employees Liability Act, damages are measured and awarded based on the loss to survivors, but not loss to the estate. Alabama provides for punitive damages only.<sup>6</sup>

Without doing justice to all the variety, most states allow recovery for future earnings capacity less the personal consumption expenses of the decedent. The pecuniary value of household services (usually measured by replacement cost) is also generally recoverable. Considerable variation exists among the states in the way inflation and discounting of future earnings and costs are to be handled, and in whether future taxes must be deducted.

Deduction of personal consumption expenses is the rule in states that measure damages as losses to survivors. As Brookshire notes, however, even most "lost to the estate" jurisdictions require deduction of the decedent's personal consumption. However, such a deduction is illogical because under the "loss to the estate" measure of damages, "...the decedent's estate recovers for the decedent's loss of earning capacity as if he had lived out his normal life span, as well as for reasonable medical expenses (which are necessarily past medical expenses)." (1987, p. 201) Thus, if damages to the estate are to be equivalent to the damages that would have been provided in a personal injury award (where the person was totally and permanently disabled, but with only past medical expenses), no personal maintenance expenses should be deducted.

#### **IV. Optimal Compensation for Wrongful Death**

In order to examine the possible role of WTP valuations of life in wrongful death cases, it would ideally be desirable first to consider three questions: (i) What is the optimal level of compensation in a case of wrongful death? (ii) What can be said a priori about how and in which direction actual compensation deviates from optimal compensation? (iii) If a gap exists between actual and optimal compensation, does the use of a measure of the "value of life" using the WTP method give a damage figure (either as a substitute for or a supplement to other damages) that corrects for this gap?

I cannot give full answers to these questions here. Some partial answers to questions (i) and (ii) are sketched in this section. The next section takes up question (iii). For the first question regarding optimal compensation, a number of answers have been given. Among the various definitions of optimal compensation are the following:

(a) the amount of purely economic damages sustained by the decedent's survivors. These would be damages measured by the HC method, defined broadly to include foregone earnings and fringe benefits, medical and funeral expenses, and the value of non-market services, less personal consumption expenses

(b) the amount required to make the person whole, or restore the person to the original level of well-being, if possible; compensation is made for all economic damages in definition (a), personal consumption expenses are not deducted, and there is additional compensation for any pain and suffering.

(c) "...the insurance coverage that a rational, well-informed individual with a socially acceptable level of income would have bought. That is, the determination of optimal compensation ought to reflect a hypothetical decision about the purchase of insurance. This point of view does not imply that actual compensation should necessarily be left up to individuals and their insurance companies...individuals may not make well-informed decisions about insurance (or may not have socially appropriate incomes.)" (31, Shavell, 1978, p. 37)

Both (a) and (c) provide compensation of survivors. Definition (c) is survivor-oriented because life insurance is, of course, for the benefit of others rather than the person insured. Definition (b), in contrast, is oriented toward compensation of the decedent's estate for damages sustained by the decedent. Shavell argues that definition (c) is optimal because "... under ideal conditions reliance on consumer preferences and on the price system results in a Pareto optimal outcome." (31, 1978, p. 37)

In a highly simplified model, Shavell (31, pp. 56-7) has explored the relationships between (a), (b) and (c). He shows that the optimal amount of insurance coverage chosen by the individual may be less than what would be needed to make the individual whole and perhaps even less than the purely economic losses. (The way Shavell derives these conclusions is shown in the Appendix.) The relationship between (a), (b) and (c) depends on the type of accident (i.e., mild, severe, or fatal, and if non-fatal, the exact type and permanency of the injuries), and on the relationship between the person's utility function in the no- accident state of the world as compared with the person's utility function conditional on having the accident. If the utility of wealth when the accident does not occur,  $U(y)$ , exceeds the contemplated utility of wealth if the accident occurs,  $V(y)$ , and if, in addition, the marginal utility of wealth,  $U'(y)$  exceeds  $V'(y)$ , for all levels of  $y$ , then the optimal amount of insurance chosen (which is the amount of insurance needed to equate the marginal utility of wealth in both states of the world) will be insufficient to cover all economic losses, much less pain and suffering. If  $U'(y) = V'(y)$  for all  $y$ , then coverage will equal economic losses but there will be nothing for pain and suffering. Finally, if  $U'(y) < V'(y)$  for all  $y$ , then the individual will obtain more coverage than necessary to compensate for purely economic losses and some compensation (perhaps even enough to more than make the individual whole) will occur for pain and suffering. Shavell speculates that it is plausible that  $U'(y) = V'(y)$  for an accident that does not result in permanent disability. For moderate permanent disabilities, he regards  $U'(y) < V'(y)$  as a possibility. In cases of severe disability (the person is a "vegetable") or death, he regards  $U'(y) > V'(y)$  as likely, implying

less than complete insurance coverage even for economic losses.

A problem with applying Shavell's benchmark in a death case is that it is not clear how one would determine the optimal amount of insurance a given individual should have had, even if there is agreement that (c) is the ideal measure of damages. The actual amount of life insurance coverage on an individual's life (through life insurance policies purchased by the individual, the employer, union, and any government programs) may differ from the optimal coverage posited in (c). Amounts of coverage may not be optimal because of administrative costs, and problems of moral hazard, pooling of unequal risks and misperception of risks. (31, Shavell, pp. 39-43)

Turn now to the second question about how far actual compensation deviates from optimal compensation. In most states, actual compensation corresponds closely with definition (a). Is actual compensation optimal, too great, or too small? For death cases, actual compensation would be too great if (c) is how optimal compensation should be defined and Shavell's conjectures about the relationship between  $U'(y)$  and  $V'(y)$  are correct. For the optimal amount of life insurance coverage would be less than the amount required to cover purely economic losses, which are measured by (a). However, optimal coverage is difficult to observe and Shavell's conjectures need to be researched more thoroughly. If (b) defines optimal compensation, on the other hand, then levels of actual compensation are too small. Arguments in favor of definition (b) derive in part from criticisms of definition (a) of the following kind: Are we not worth more than our net earnings and pecuniary value of services? It would seem, at least on the surface, that the answer must be "yes." For if the answer is "no," then (as pointed out, inter alia, by Thornton and Schwartz (Jan. 1987)), there are a number of seemingly unappealing implications: the value of a retired person's life must be zero (or no more than the value of service contributions to others); someone totally and permanently disabled must have a life valued at zero; and it is better (because of the deduction for maintenance in the case of death) from the defendant's point of view to kill someone than to cause a permanent disability.

Looking more closely, it becomes apparent that these implications are unappealing in certain contexts, but not necessarily in others. In particular, from an ex ante perspective, these objections carry considerable force, because compensation definition (a) pertains to survivor losses and leaves out of account the decedent's desire to live. From an ex post perspective, where the person in question is already dead, the objections seem much less compelling. It is presumably a good thing that greater compensation is paid when a person is totally disabled than when a person is killed, and that greater compensation is paid, say, when a young husband and father of two is killed than when the person who died is retired and supporting no one.

An important additional issue is whether use of compensation definition (a) carries

with it an appropriate set of incentives to deter careless behavior. If we confine damages to those suffered by survivors and do not require compensation for the loss of life of the deceased, are the incentives for guarding against carelessness too weak relative to what is optimal? In other words, with definitions (a) and (c), is there a component of the *ex ante* cost of accidents that is not taken into account by economic agents? As described by such scholars as Guido Calabresi (1970) and Walter Oi (1974), the goal of public policy with regard to accidents should be to minimize the sum of accident and accident-prevention costs. It is surely appropriate to include in the *ex ante* cost of accidents the contemplated harm associated with own-loss of life, as well as the damage the loss of one's life would cause for one's survivors. However, where a person is deciding on whether to be exposed to the risks of everyday life, such as driving a car, presumably the risk of losing one's life has already been taken into account in the private choice calculus of drivers. To what extent one takes account the value others place on their lives when deciding on the appropriate level of care is less clear. In cases like driving where protecting the lives of others is a joint product arising from self-protection, the "externality" may be wholly internalized. Even where self-protection and protection of others are not jointly produced, some internalization of the prospective cost of causing someone's death may occur as a result of reflecting on the regret one would feel in having to live with the responsibility of having caused someone's death. The general deterrent effect of damage awards is a topic warranting more research. Included in such research would have to be an analysis of the moral hazard problem arising from the fact that most such awards are paid from insurance and limited to the amount of insurance available to cover the damages.

## **V. The Problem with the Use of WTP-Based Measures of Hedonic Damages**

My criticism of using WTP "value of life" estimates to guide the award of damages in wrongful death cases is based on the following propositions:

- #1. When you're dead, you're dead. It is impossible to compensate a dead person. Compensation is only for the living. The logical beneficiaries in a death case are the survivors of the deceased.
- #2. Ex ante, there exists for virtually all people a dollar value that is equivalent to a small change in the risk of death, but (for the great bulk of people) no amount of money that can compensate for the certainty of one's own or a family member's death.
- #3. Ex ante statistical risk of death and ex post death of a specific, named individual are not the same thing.

While estimates of the "value of life" are vital for the conduct of cost-benefit analyses of many public policies, the key question is: "What, if any thing, do these

estimates imply about the compensation that should be paid in cases of wrongful death?" These three propositions suggest that the best short answer to this question is, "Nothing."

Proposition #1 can be elaborated by considering a possible analogy between a compensation award for the destruction of a physical asset with the compensation in a wrongful death case. In the former, it is assumed that the asset is worth to its owner (say, Mr. Jones) the amount that would have to be paid to replace the asset.<sup>7</sup> Replacement cost is fair compensation. By analogy, if Jones demonstrated by his consumption or labor market behavior involving risks of death that his "value of life,"  $dW/dP$ , is implicitly \$1,000,000, then the negligent destruction of Jones' life would justify compensation of \$1,000,000. The only (!) difference between these two situations is that in the first case, the person is capable of being compensated (i.e., being put back on the same indifference curve) by a sum of money equal to the replacement cost of the destroyed physical asset. In the second case, the person is dead and literally cannot be compensated. If a \$1,000,000 award of money takes place, such an award must reduce the utility of one group of living persons (abstracting from interdependent utility functions) and raise the utility (over what it otherwise would have been) of another group of living persons. Compensation has no value (so far as we know) to the decedent; rather, it has value only to the living. Moreover, while the survivors almost surely have been harmed, there is no logical link between the decedent's  $dW/dP$  and a correct monetary measure of the harm to survivors.

Turn now to Propositions #2 and #3. Application of WTP measures to estimate damages in death cases fails to take account of Schelling's (1968) fundamental distinction between a statistical death and an individual death. An example of the former is the Surgeon General's estimate that in excess of 300,000 deaths each year derive from smoking (40, 1989). Our reaction to this estimate tends to be impersonal and disassociated from specific individuals. We do not shed tears. By contrast the death of a specific, named individual is an entirely different matter in terms of our reactions:

"The avoidance of a particular death -- the death of a named individual -- cannot be treated straightforwardly as a consumer choice. It involves anxiety and sentiment, guilt and awe, responsibility and religion. If the individuals are identified, there are many of us who cannot even answer whether one should die that two may live. And when half the children in a hospital ward are to get the serum that may save their lives, half a placebo to help test the serum, the doctor who divides them at random and keeps their identities secret is not exclusively interested in experimental design. He does not want personally to select them or to know who has been selected. But most of this awesomeness disappears when we deal with statistical deaths, with small increments in a mortality rate in a large population." (30, Schelling, 1968, p. 142)



The pertinence of Schelling's distinction is clear. Efforts to estimate WTP seek to determine how much an individual pays or gets compensated for receiving or putting up with a small change in the probability of death. This is the realm of statistical death. In sharp contrast, in all death cases, some specific, known individual has died. Aside perhaps from situations of terminal illness, few would argue that this known individual would have willingly surrendered his or her life for the amount  $dW/dP$ . The contexts of (i) certain death, and (ii) a small change in the probability of death, are so different that one must doubt the applicability of a monetary sum derived from context (ii) to context (i). This means that the very procedure of dividing  $dW$  by  $dP$  and calling the resultant quotient the "value of life" is very misleading. The quantity dimension in these two contexts is different. What a person will pay for a probability reduction cannot be extrapolated in a facile manner to what will be paid to avoid an event with certainty, because the event with certainty is a very different thing than the small probability of the event's occurrence. There is no reason to believe that the WTP measure gives the amount of money a person would accept in compensation for allowing himself to be killed, nor does either the WTP or HC measure indicate a ransom that a person would offer to avoid being killed. (HC might be related to the size of a ransom offer that kidnapers would believe.) The reason WTP is not reliable in this context is that for probabilities of death close to 1, the utility function presumably takes on values approaching negative infinity. These non-linearities make the result derived from dividing the amount one is willing to pay by the change in probability unreliable.

## VI. Summary and Conclusions

This paper has questioned whether compensation for the loss of the enjoyment of life, as measured by the WTP method, is an appropriate element of damages in cases of wrongful death. The logic of confining compensation measures to what has been lost by survivors seems very strong. Because any damages must go to survivors, awarding hedonic damages could lead to compensation of survivors far in excess of the economic damages they experience as a result of the death. WTP measures of the "value of life" are derived ex ante. Wrongful death cases by their nature deal with events ex post. These contexts are so different that measures for one appear to be wholly irrelevant to the other.

Damage awards do more than provide compensation. They also serve to deter negligent behavior and encourage economic agents to take precautions that reduce the likelihood of accidents. The deterrent effect of damage awards is a topic warranting more research. If a link exists between the WTP method of estimating the "value of life" and optimal compensation in death cases, it must be sought here. It does not appear to reside anywhere else.

## FOOTNOTES

\*I would like to thank Don Kenkel, John Riew, Eli Schwartz and Robert Thornton for comments. Any errors in fact or logic are my own.

1. References to the use of the HC method include L.I. Dublin and A. J. Lotka, (13, 1946), Kneese, (22, 1966) and R.G. Ridker (28, 1967). More recent papers comparing the HC and WTP measures are W.B. Arthur (2, 1981) and Bryan Conley (10, 1976). The HC approach can also be widened in a very natural way to value time not spent in market work. An excellent discussion of this extension and its application to personal injury and death cases is found in Komesar (23, 1974).

2. Excellent conceptual papers on the WTP method are Michael Jones-Lee (16 and 17, 1974 and 1976), E.J. Mishan (24 and 25, 1971 and 1982), Schelling (30, 1968), Usher (35, 1973) and Zeckhauser (39, 1975).

3. Perhaps the best discussion of the rationale for use of the WTP approach and the deficiencies of the HC and other approaches is found in Mishan (25, 1982). The basic problem is that these other approaches are not directly related to how the affected individual values the changes in risk. John Broome (5 and 6, 1978 and 1979) provides a vigorous critique of the WTP approach. His paper generated a number of equally vigorous comments in defense of the WTP approach. See the comments by James Buchanan and Roger Faith (8, 1979), Jones-Lee (18, 1979) and Alan Williams (38, 1979).

4. Those who have seen the movie "The Deer Hunter" will recall the gambling den in Saigon where Russian roulette was played by highly-paid "professionals" with very short life expectancies.

5. See Jan Action (1, 1976), Glen Bloomquist (4, 1979), Jones-Lee, et al. (20, 1985), Michael Moore and Kip Viscusi (26, 1988), Richard Thaler and Sherwin Rosen (32, 1975), Viscusi (36, 1978) and Viscusi, et al. (37, 1988), among others.

6. In England, the HC method is also employed. An action to gain compensation can be sought under the Fatal Accident Acts 1846-1959. The right to damages is available to persons who were dependent on the decedent. See R. Kidner and K. Richards (21, 1974).

7. For an analysis of the loss of an irreplaceable asset, see Philip Cook and Daniel Graham (11, 1977).

## APPENDIX

The relationship derived by Shavell (31, pp. 56-7) among (a) compensation for economic losses (which I equate here to losses as measured by the human capital approach), (b) compensation sufficient to make the individual whole, and (c) optimal insurance coverage, can be presented as follows: Let  $p$  be the probability of an accident, the severity of which could vary from a non-permanent, mild injury, to a fatal accident. Let the economic loss caused by the accident be given by  $z$ . Further, let  $U(y)$  be the utility of wealth function if there is no accident and  $V(y)$  be the utility of wealth if there is an accident. Further assume that the individual is a von Neumann-Morgenstern expected utility maximizer who is risk averse, meaning that  $U$  and  $V$  are concave functions. Let  $c^*$  be the optimal amount of insurance coverage that the individual chooses to buy paying a premium of  $pc^*$  (assuming actuarially fair insurance). Finally, assume that the accident is a source of disutility so that  $U(y) > V(y)$ , for all  $y$ . The expected utility that is to be maximized is given by:

$$(1) \quad (1-p)U(y - pc) + pV(y - pc - z + c)$$

To maximize expected utility, it is necessary that marginal utilities be equated in both states of the world:

$$(2) \quad U'(y - pc^*) = V'(y - pc^* - z + c^*)$$

To allow comparisons with the case where the person is "made whole," define  $c^{**}$  as the amount of coverage -- if such a  $c^{**}$  exists -- that will equate total utility in the two states of the world:

$$(3) \quad U(y - pc^{**}) = V(y - pc^{**} - z + c^{**})$$

Given this structure for the problem, a number of conclusions can be drawn. First, the amount of insurance needed to compensate purely economic losses,  $z$ , is less than what is needed to make the person whole,  $c^{**}$ . This is due to the assumption that  $U(y) > V(y)$ , for all  $y$ . If  $z = c^{**}$ , (3) reduces to the statement that  $U(y - pc^{**}) = V(y - pc^{**})$ , which contradicts  $U(y) > V(y)$ , for all  $y$ . Hence,  $z$  must be less than  $c^{**}$ . The positive difference,  $c^{**} - z$ , compensates for "pain and suffering."

Second, of critical importance is the relationship between  $U'(y)$  and  $V'(y)$ . If  $U'(y) > V'(y)$ , for all  $y$ , then (2) combined with diminishing marginal utility (concavity) imply that optimal coverage,  $c^*$ , must be less than the economic loss,  $z$ . Hence, the relationship  $c^* < z < c^{**}$  holds, meaning that even economic losses are not fully insured, much less pain and suffering. If, alternatively,  $U'(y) = V'(y)$ , for all  $y$ , then by (2) and concavity,  $c^* = z$ . Economic losses are fully insured, but the insurance coverage falls short of compensating for pain and suffering. Finally, if  $U'(y) < V'(y)$ ,  $c^*$  will exceed  $z$ , meaning there will be some

coverage of pain and suffering. In fact,  $c^*$  could conceivably exceed  $c^{**}$ , utility being higher with the accident and compensation than if the accident did not happen.

How do  $U'(y)$  and  $V'(y)$  compare for different types of accidents? Little research (by economists at least) appears to have been done on this question. For fatal accidents, it would seem plausible that either  $U'(y) = V'(y)$ , or  $U'(y) > V'(y)$ . A person might buy life insurance to cover economic losses that would be sustained by dependent survivors, but not for pain and suffering prior to death or the loss of enjoyment of life itself. In other words, for most people a finite  $c^{**}$  does not exist and behavior is consistent with the "when you're dead, you're dead" proposition.

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