

Risk Assessment and Occupational Health

Conceptual Problems

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Case studies can demonstrate *abuses* of risk assessment: suppressing information, ignoring data, or other forms of deception. When a clear abuse has been documented, it is easy to condemn it and point out how the risk assessment *should* have been done. However, abuses should not be dismissed as atypical aberrations. They may, in practice, be very hard to correct. It is worth asking why such abuses seem so prevalent.

Nonetheless, cases of clear abuse may leave unexamined some other conceptual issues. Even if it is done “right,” is risk assessment a good tool for analyzing policies for occupational health and safety? This seemingly simple question contains profoundly difficult issues. Assume for a moment that we know what it means to do the assessment right, that is, in conformance with the best professional standards and with strict adherence to openness and honesty. How does risk assessment claim to be good for the policy process and what is problematic about that claim?

RISK ASSESSMENT: MAIN FEATURES

Risk assessment has been called “formalized common sense.”¹ At first glance, the description seems apt. Different authors give slightly different descriptions of the process.²⁻⁴ Nonetheless, all the descriptions include steps such as identifying hazards associated with some activity or policy, calculating their effects (usually on mortality and morbidity), estimating exposures to the hazards, and, finally, calculating the expected value of the harm actually entailed by the policy or activity in question.¹ The mathematical details may vary, but in general terms the final result is calculated by summing over all possible events the product of the probability of the event occurring and the consequences if it does occur.

This methodology is intuitively appealing. We would like the best possible information on the hazards workers face, the possible effects of those hazards, workers’ exposure to them, and the total harm we expect to see as a result. Such information and analyses are important steps in protecting worker health. However, risk assessment also dictates the way we collect, structure, and use this information. Risk assessors make two additional claims about their technique. First, they argue that risk assessment should be done separately from risk management, that is, risk assessment should not determine policy choices, but rather should serve only as an objective input—one among several—to the policy process.^{3,5} Second, the use of risk assessment to decision-makers is that it helps them understand the consequences of their choices, particularly the trade-offs that they

must often make between levels of expenditure, for protection and lives lost. The argument implies that to confront such trade-offs explicitly is beneficial to the policy process.³

I will mention a few reasons why it may not be possible or desirable to keep risk assessment entirely separate from policy choices and to quantify explicitly all the trade-offs involved in different policy choices. My paper is synthetic, drawing on the work of scholars from a variety of fields, and is not comprehensive. It does suggest, however, that the choice of analytic framework for examining occupational health issues is a normative one, and that risk assessment, as it is conventionally described, may be the wrong choice.

PROBLEM FRAMING AND VARIABLE CHOICE

When doing risk assessment, there are many ways to frame the problem. No scientific criteria are available by which to attempt such framing. Thus, the choice of frame necessarily involves policy choices. The decision of how to do the risk assessment must be guided by choices about risk management. The processes are tightly linked.

Crouch and Wilson³ illustrate this problem well. They present graphs of the trends in accidental deaths in the mining of coal. If the number of deaths per 10⁶ tons of coal is measured, the trend from 1950–1970 is clearly down. However, if the number of deaths per 1,000 coal miners is measured, the trend is up. How should the problem be framed?

Crouch and Wilson (p. 14) state that risk assessment should not frame the problem. Rather, a “good” analyst should present both results to the decision-maker, and let him choose. However, that answer has several problems.

First, it assumes that the analyst thinks of all the different ways in which the data could be presented. Nothing exists in the methodology of risk assessment that insures or even suggests such completeness. Adherence to professional standards does not preclude mechanical, unimaginative, or pedestrian analyses.

Perhaps more importantly, the philosophic roots of risk assessment bias it in favor of aggregate, society-wide problem framing and away from concern with large risks for small numbers of people. One of the roots of risk assessment is cost/benefit analysis, which in turn has its roots in microeconomics. When cost/benefit analysis is applied to risks, it carries with it the assumption that the most desired outcome is the one that is most “efficient,” that has the greatest net positive benefits, which usually means the greatest benefits in the aggregate sense.⁶

Such increasing efficiency, as in coal mining, may be purchased at the expense of a small number of people, that is, workers. The number of fatalities per million tons of coal dropped steadily from 1950–1970 (with the crucial exception of 1968) from 1.15 to 0.42.⁷ However, mining was not getting safer. Miners were losing their jobs as new technology enabled mines to keep up production with fewer workers. The number of persons working daily fell from 483,000 in 1950 to 144,000 in 1970. Total coal production fluctuated during the same period, but increased somewhat, from 516 to 603 million tons.⁸ Thus, hundreds of thousands of miners lost their jobs, and those who remained employed faced substantially increased risks, as the number of fatalities per thousand miners went from 1.33 in 1950 to 1.81 in 1970.⁷ The distribution of risk in this industry raises important issues of social equity.

Crouch and Wilson³ themselves subtly suggest that broad, aggregate variables are preferable to ones that reflect distributional issues. In discussing the two ways of framing coal miner death problems, they characterize them by noting that, "From a national point of view, given that a certain amount of coal has to be obtained, deaths per million tons of coal is the more appropriate measure of risk, whereas from a labor leader's point of view, deaths per thousand persons employed may be more relevant." (p. 13). Concern with aggregate measures is depicted corresponding to a broad public interest, whereas concern with the distribution of risk is seen as the pleading of a "special interest." Declaring distributional issues to be of secondary importance is a very powerful normative claim.

UNCERTAINTY AND THE BURDEN OF PROOF

In any risk assessment, there are always enormous uncertainties of a variety of types, such as the toxic effects of a substance, the patterns of exposure, and the dose-response relation. Judgment calls are always necessary to determine when to begin worrying about a potential hazard or when to declare some activity "safe." When for the purpose of regulation is a risk clearly considered significantly greater than zero? A methodology that stresses the use of expected values invites furious debate over the data and puts the burden of proof on those who claim that the risk is worth considering. Such a burden is greater than might be expected. It is often difficult, and always expensive, to prove that some substance or activity poses a significant risk to workers. For example, toxicologic data often come from animal experiments. Those experiments are costly, and their results can be disputed on numerous technical grounds, requiring more experiments and raising the cost of proof ever higher.

The burden of proof issue can be subtle in risk assessment. The methodology looks for hazard, not for safety. It does not "see" hazard unless empirical evidence of a statistically significant level of harm is actually in hand. These requirements clearly place the burden of proof on those at risk and have very clear implications for regulatory policy. Greenwood⁹ found that industry's calls for "better scientific grounding" for regulation were often part of a deliberate strategy of deregulation. Whenever someone says that "There is no evidence that X is a risk," we should ask if there is any evidence that X is *not* a risk.

CONSENT AND CHOICE

Many people choose to engage in risky activities, such as skiing or hang gliding. However, when imposed risks are theoretically escapable, does choosing *not* to escape them imply consenting to accept the risk? If workers do not quit a job that they know entails risk, does that mean that they agree to accept those risks? Workers are not slaves. No one can force them to stay in a job. Does their freedom of choice mean that they have chosen their risk? Baier¹⁰ gives a lengthy argument, based on moral theory, that such choice does *not* necessarily imply consent. There are several reasons, but the most salient is the distinction between work risks and leisure risks; taking a job is much more likely to involve economic compulsion or at least limited choices.

EXPLICIT VALUATION OF LIFE AND CALLOUSNESS

Assessing risks quantitatively, comparing them to benefits, and trying to maximize the benefits means, at least implicitly, attempting to monetize such things as injury, suffering, and death. Risk assessors argue, quite correctly, that we are not willing to spend an infinite amount of money to save lives, and that the amounts we do spend vary enormously by circumstance. However, is it wise to argue that we should state explicitly that we are willing to spend so much for a life, and no more? Bogen¹¹ has argued that such explicit statements can put us on a morally slippery slope, that talking about life in those terms can, over time, make us increasingly callous to life's value, and that the monetary value we affix to it will go down over time.

The refusal to monetize life does NOT mean that we impute an infinite monetary value to it. MacLean¹² argues that making life a *sacred* value has important ritual and symbolism connected with it. Those rituals and symbols contribute to the quality of life. Calculation that "deritualizes" the value of life may promote a cold attitude among people and exploitation of man by man.

Finally, it has been noted for years that many important risks and benefits have no market value and are very difficult to quantify, much less monetize. Hoos¹³ has argued that emphasis on quantification will simply omit, or greatly downplay, factors that are difficult to quantify.

CONCLUSION

Much research and analysis on occupational health and safety remain to be done, and that work should be advanced as rapidly as possible. However, for the reasons just discussed, conventional methods of risk assessment as an analytic framework for that research pose serious problems for worker protection, even if the assessment is done right. The regulatory process must be made responsive to the issues discussed herein, such as the distribution of risk and the social effects of quantitative analysis.

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