



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
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OFFICE OF  
THE ADMINISTRATOR

Honorable Carol M. Browner  
Administrator  
U.S. Environmental Protection Agency  
401 M Street, S.W.  
Washington, DC 20460

Subject: Science Advisory Board's Comments on the Office of Management and Budget's "Health-Health" Concept.

Dear Ms. Browner:

On July 14-15, 1992, the Environmental Economics Advisory Committee (EEAC) meet in Arlington, Virginia and discussed the central premises of the health-health (sometimes referred to as risk-risk) concept, and the analyses and evidence supporting the tradeoff suggested by the concept. In its simplest form, health-health postulates that, under certain conditions, the cost of health and safety regulations reduce individual income/wealth, and thus reduce resources available to individuals for expenditures on a wide range of goods and services that contribute to the individual's health, including the purchase of health care. If the postulated relationship is valid, it is conceivable that a health/safety regulation could have a net negative effect on aggregate measures of the nation's health by reducing the income available to people to meet other needs.

**1. Background and Charge**

On March 10, 1992, James B. MacRae, Jr., Acting Administrator and Deputy Administrator of the Office of Information and Regulatory Affairs of the Office of Management and Budget (OMB) wrote a letter (MacRae, 1992) to the Occupational Safety and Health Administration (OSHA), returning their proposed rule "Air Contaminants Standard In Construction, Maritime, Agriculture, and General Industries" for further analysis to evaluate how compliance with the rule would affect workers' employment, wages, and therefore, access to health care. Citing an opinion by the U. S. Court of Appeals for the District of Columbia, the MacRae letter noted that existing research (Keeney, 1990) had calculated that each \$7.5 million in additional regulatory expendi-

tures may result in one additional death from the adverse health effects associated with lower incomes (The figure calculated by Keeney was actually \$7.25 million in 1984 dollars. It was incorrectly cited in the court decision and the MacRae letter as \$7.5 million). Keeney (*op. cit.*) was careful to suggest that his estimates were intended to illustrate general issues not for specific policy uses, noting that: "...It is important to stress that calculations in this paper are illustrative only (p. 155) [emphasis added]."

Since then, the OMB has raised the issue with regulatory agencies and suggested that they should recognize the effect of regulatory costs on individuals' expenditures that affect their health. In particular, they have suggested that regulatory costs lower individual wealth and consequently can lead to increased mortality rates. In the Charge given to the EEAC, the EPA Office of Policy, Planning, and Evaluation posed four questions:

- a) How should these issues be addressed to support reviews and reauthorizations of laws covering Superfund, other hazardous waste cleanups and clean water?
- b) Is the conceptual argument appropriate for decisions that require the government to protect health, regardless of costs (e.g., Primary National Ambient Air Quality Standards)?
- c) Is research quantifying the health-health tradeoff worth pursuing? Which aspects of this issue should receive priority?
- d) Is the current research using the best methodology?

The Committee reviewed the literature cited in the OMB letter (*op. cit.*) and in subsequent testimony by MacRae (MacRae, 1992a) before the Senate Committee on Governmental Affairs. It received a summary of the issue from EEAC Member Dr. W. Kip Viscusi (who has served as a consultant to the Regulatory Information Service Center of the Executive Office of the President on this topic) and was informed of the GAO review of these analyses by Committee Co-Chair Dr. Allen Knesse. Both general and specific problems with the conceptual framework underlying health-health analyses and its implementation in policy were identified. These comments draw from the reactions of Committee Members and report their consensus on the issue; they also reflect as well the Committee's diversity in opinions about what would be necessary to develop the existing evidence to a point where it could play a role in policy evaluations. Each of these aspects is addressed below as the Committee seeks to respond to the

questions given in EPA's charge that are relevant to the appropriate uses of economic methods in environmental policy analyses.

## **2. Principal Conclusions**

- a) The first question posed is so all-encompassing as to be outside the scope of this review. The further work implied in responses b), c) and d) may have to be accomplished, at least in part, before the question can be addressed. The EEAC would be pleased to review proposed analytic approaches for addressing reauthorization of Superfund and other laws when these methodologies are available.
- b) The logic underlying a health-health analysis is sound, although as currently envisioned it would only have narrow applications; furthermore, there is not presently a sufficient basis, even for such narrow applications, for determining whether the effect of income changes on health is significant or for estimating its magnitude.
- c) Additional exploration and analysis is warranted, ideally utilizing a longitudinal data set so that changes in health status (morbidity and mortality) could be measured and related to changes in income while controlling for other important factors.
- d) It would be inappropriate to describe the published efforts to date as "research," hence this question can not really be answered. As noted earlier in this letter, Keeney (*op. cit.*) described his calculations as "illustrative," and did not recommend their use in decision-making or policy formulation. Suggestions for appropriate research approaches are provided in the detailed review following.

## **3. Detailed Review of Health-Health Analyses**

Comparing the mortality risk associated with regulatory costs with the mortality risk reduction from the regulation makes some sense when the law mandates setting regulations to protect human health without regard to economic costs, and when the regulation's only effect is to reduce mortality risks. Given this objective function as expressed in the law, the process of responding to those objectives requires examining

net health risk effects. To the extent that lower income is associated with poorer health, the adverse health effects go beyond increased mortality risk. If large populations experience both kinds of risk, it will be difficult to judge which risk would be of greater concern.

If the circumstances do support using the health-health tradeoff to evaluate policy, it must be made very clear that we do not presently have an adequate empirical basis for predicting the morbidity and/or mortality consequences of imposing regulatory costs on society. It is important for the Agency to develop a clear and concise explanation of what is required to implement such a health-health comparison and why the existing analyses are flawed. Such an exercise would be a much larger enterprise than the EEAC can undertake without supplementary resources, but as a point of departure we have summarized below a few of the questions raised about the research we reviewed.

First, crucial data for implementing the constituent elements in a health-health framework are about twenty years old and pertain to large groups of people rather than the behavior of individuals. Life styles have changed considerably in that interval, especially among the economically advantaged. Smoking and alcohol consumption have declined among more affluent males, but not among lower income men. These life style differences are prominent causes of differences in morbidity and mortality between the two groups.

Second, all of the studies examined by the Committee (except that of Graham *et al.*, 1992) are based on a cross-section analysis of mortality rates (or some other measure of adverse health status) and some measure of economic status. These cross-section analyses do not always control for confounding variables. And even when they do, problems of simultaneity exist, for example when poor health causes both lower income and a shorter life expectancy.

But even if the cross-section studies were done well, they would not be appropriate for the task at hand. Regulations impose relatively small and essentially transitory income losses on large numbers of people without changing other factors such as education, health capital, genetic endowment, and basic life style, all of which we know to be important determinants of mortality and other health status outcomes. The

dynamics of imposing regulatory costs are simply quite different from the static cross section relationships currently used in the articles by Keeney and Graham *et. al.* (*op. cit.*).

It also seems plausible that the marginal impact of a decline in income is a function of the victim's income level. In particular, it appears from the Keeney data (*op. cit.*) that a decline in income would have a larger effect on lower income groups than higher income groups. Current research is not sufficient to uncover whether the marginal and average health effects of a decline in income are the same. Assuming they are the same (as current analysis does) could produce some seriously mistaken policy conclusions.

It is possible, for example, that health effects would be greater when a small number of people lost jobs rather than in situations where a larger number experience small reductions in their incomes. Studies relating the unemployment rate over a business cycle to mortality and other social problems are limited, however the paper by Graham *et al.* (*op. cit.*) suggests that the relationship is not robust. If there were a positive relationship between unemployment and mortality, the problem would be to establish the relationship between specific regulatory costs and the unemployment rate.

The Committee identified a variety of additional issues as well. For example, one should not be concerned simply with the regulation's cost. Analysts should be concerned with its ultimate general equilibrium effects in terms of the costs generated. If this technique is to be of general use, an effort should be made to deal with adverse effects of income losses resulting from regulations on health impacts other than mortality, such as morbidity. Finally, the Committee felt it was important to emphasize that, although it will be sufficient to deal only with health attributes in some cases, most regulations will involve other benefit components (such as ecological effects).

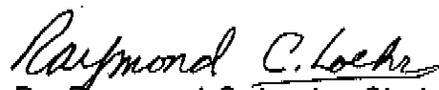
As economists, we would recommend the use of benefit-cost analyses that take full account of all the benefits and costs associated with any regulatory policy. To the extent that policy analyses must take place in a constrained setting where statutes limit the types of information that can be used to evaluate regulations, then in these cases, health-health comparisons might be appropriate, but only if they are carefully and correctly calculated. National Ambient Air Quality Standards most certainly involve many other effects besides decreases in mortality risk and thus cannot be evaluated solely with health-risk methodology.

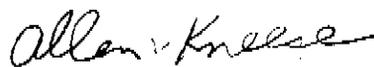
In summary, the Committee has responded to three of the four questions posed. (The first question is so all encompassing as to be outside the scope of these comments). On the second question, the logic underlying a health-health analysis is sound. That is, higher levels of household income generally are associated with better health of its members. However, acknowledging this simple connection does not deny the complexity of these connections at a societal level. They reflect health care demand and life style, as well as the demographic and genetic composition of the society being represented. Although the first two are affected by income, relying on current statistical analyses as direct inputs to policy analyses based on the existing research record would be a mistake. There is not presently a sufficient empirical basis for determining whether the effect of income changes on health is significant or for estimating its magnitude.

Thus, the answer to the third question is yes, additional research is warranted. Ideally, this would utilize a longitudinal micro data set so that changes in health status could be measured and related to changes in income while controlling for demographic, and genetic, characteristics, as well as past life style and health related behavioral decisions.

We look forward to receiving your response to our comments.

Sincerely,

  
Dr. Raymond C. Loehr, Chair  
Science Advisory Board

  
Dr. Allen Kneese, Co-Chair  
Environmental Economics  
Advisory Committee

  
Dr. V. Kerry Smith, Co-Chair  
Environmental Economics  
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ENCLOSURES

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- Graham, J.D., Hung-Chang, B. and Evans, J.S. 1992 Poorer is riskier, Centers for Risk Analysis and Injury Control, harvard School of Public Health. Unpublished.
- Keeney, R.L., 1990. Mortality risks induced by economic expenditures. *Risk Analysis* 10:147-159.
- MacRae, J. B., Jr. March 10, 1992. Letter to the Honorable Nancy Risque-Rohrbach, Assistant Secretary for Policy, U.S. Department of Labor.
- McRae, J.B., Jr., 1992a. Statement of John B. McRae, Jr. before the Senate Committee on Government Affairs, March 12, 1992.

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