

Yet, while many things have stayed the same since the 1920s, some things have changed. Shifts in technology, a rejoining of the public health and social reform movements along with a resurgence in interest in the environment, and greater access to scientific resources by the consumer movement have all served to bring about changes in a fashion similar to the period before 1906. The National Environmental Policy Act, the Occupational Safety and Health Act, and the Clean Air Act, to name three examples, have given new strength to public health considerations in the decision-making process. It remains for future historians to tell us the significance of all this.

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Science and Policy Making



Even the most casual observer of the human scene understands that the choices people make are influenced heavily by the way in which the options are phrased, and by other circumstances that would appear to be external to the issue. Indeed, the artful framing of a question is an important skill that can be applied in virtually all aspects of interpersonal relations.

A cogent illustration of the import of the framing of decisions was given by Tversky and Kahneman,¹ who posed the following problem to university students:

"Imagine that the US is preparing for the outbreak of an unusual Asian disease, which is expected to kill 600 people. Two alternative programs to combat the disease have been proposed. Assume that the exact scientific estimate of the consequences of the programs are as follows:

If Program A is adopted, 200 people will be saved.

If Program B is adopted, there is a $\frac{1}{3}$ probability that 600 people will be saved, and $\frac{2}{3}$ probability that no people will be saved.

Which of the two programs would you favor?"

Given these options, 72 per cent chose Program A. Another group of students was asked to choose between a program in which 400 people would die and another program for which there was " $\frac{1}{3}$ probability that nobody will die, and $\frac{2}{3}$ probability that 600 people will die." When the options were rephrased to focus on deaths in place of lives saved, only 22 per cent chose the first option.

Epidemiologic data are often distilled to a comparison of two numbers, the rates of disease in two populations with different "exposures." The ratio of the rates ("relative risk") has been the parameter that epidemiologists prefer for causal inferences, whereas the difference between the rates ("attributable risk") has been generally acknowledged to be informative of the public health consequence of the exposure.² According to this scheme, etiologic research should use ratio measures and programmatic research should use difference measures.

Runyan and Earp,³ in this issue of the Journal, report the policy preferences of graduate students in law and

business administration for automobile passenger restraints. The students were asked to imagine that they were legislators and most of them were presented with hypothetical data framed as risks or benefits, as difference or ratio measures, and as morbidity or mortality. One group of students received no data. According to what is known of the psychology of choice, the presentation of the data as risks or benefits might have been expected to influence the policy preferences. According to epidemiologic dogma, the presentation as attributable effects or relative effects should also have made a difference. Surprisingly, the form of the data presentation seemed to matter little to the respondents. Those who received some data about effectiveness, regardless of their form, preferred some additional legislation, but the way in which the data were presented had only minor influence.

Cynics who believe that policy preferences are not heavily influenced by data will find these results reassuring, since the factors measuring preconceived attitudes apparently were considerably more important predictors of the students' policy preferences than were the data. On the other hand, those who believe that data, no matter what form they take, speak compellingly for additional legislation in this area of public policy can also bolster their beliefs from this report, since those who received data were strongly influenced in comparison with those who did not. Others who are more skeptical of the contribution of this study will point out that the contrasts offered did not distinguish clearly between difference and ratio measures, since the data were complete enough to enable quick mental evaluation of both types of measures. It could also be argued that the sparsity of data and absence of cost information trivialize the exercise as a means of evaluating policy decision-making. In addition, the presentation of data may have influenced the preferences of these pseudo-legislators only by the framing effect described by Tversky and Kahneman.¹

Policy making is ideally based on a weighing of societal risks and benefits. One obstacle is that the perceived value of risk avoidance for individuals may differ from that for society.⁴ A realistic theory of policy making should allow for

the balancing of special interests and divergent values in a political process; in such a process the role of data may be secondary and the form of data insignificant. This view may discourage the community of public health professionals who believe that policy issues should be decided on the basis of a straightforward, rational assessment of the data, but it does offer some direction to epidemiologists and other scientists who provide the data. Science is, after all, an attempt to achieve a deeper level of understanding, not an attempt to establish public policies. Therefore the job of scientists should be to formulate and evaluate scientific hypotheses, rather than to muster support for or marshal evidence against specific policies. This is not to deny the rights and responsibilities of scientists to participate, like any concerned citizens, in the political process that determines policy. It is important, however, for scientists to safeguard their scientific objectives as much as they can from secular influences. The conduct of science should be guided by the pursuit of explanations for natural phenomena, not the attainment of political or social objectives.

The futility of attempting to set policy with purely scientific input is aptly illustrated by Markowitz and Rosner, in their account in this issue of the Journal of the tetraethyl lead controversy in the 1920s.⁵ Even if the scientific evaluation of the lead hazard had been more thorough before the policy was set, the scientific information could not have provided definitive answers to the political questions about the costs and benefits. It would have helped to know more precisely the health risks, but outside of the political process there would have been no "scientific" means to weigh these costs against the purported benefits of leaded fuel anticipated by the industrialists of the time. The process of policy choice may be studied as a scientific endeavor,⁶ but policies are set by a political balancing (or unbalancing) that uses science without being beholden to it.

Social pressures accompany any work that has immediate relevance to policy, as public health science often does. These pressures influence scientists to direct their research to specific areas, a response that reasonably attends to social

needs without detracting from the quality of the scientific work. Having focused on a research area, however, scientists should ignore policy questions to persevere in pursuit of their objective, which is knowledge. Regrettably, many public health scientists do not hesitate to append policy recommendations to their scientific papers. We consider it a mistake to risk the confusion of objectives that can result from making policy recommendations in an ostensibly scientific work. Never mind that there often are policy questions to be answered. The optimists among us hope that the fruit of scientific labor will enlighten the political process that ultimately decides the policy, but let us not be deluded into thinking that policies are or should be chosen solely by the evaluation of data. The time for a scientist to be a political and social mover is after hours. Otherwise, the conduct of science to achieve political ends will corrupt both endeavors.

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Prior Publication, an Ethical Issue

The current issue of the Journal includes a paper whose publication violates an unusual variant of the "Ingelfinger Rule."^{*} Under ordinary circumstances, this Journal would not have printed this paper. Its publication, therefore, calls for an explanation, a clarification of our policy, and a statement about publication ethics.

The paper in question appears on page 382 of this issue.³ It reports a major longitudinal study of the impact and costs of different individual preventive dentistry modalities applied in school to several thousand children. The authors contend that "dental health lessons, brushing and flossing, fluoride tablets and mouthrinsing, and professionally applied topical fluorides were not effective in reducing a substantial

amount of dental decay, even when all these procedures were used together." They believe that their findings have important implications for public health policy.

The results of this study had been presented at the November 1983 meeting of the American Public Health Association in Dallas, but no manuscript or abstract was submitted to the Association's Press Room at that time, and no publicity was sought or received in connection with the meeting. The manuscript first arrived in the Journal office in February 1984.

The foundation which funded the study had chosen to call a press conference in late December 1983. At the press conference, an 18-page "Special Report," prepared in the style of a corporation annual report, was distributed to those present.⁴ Several thousand copies of the brochure were printed, and these were distributed by mail to all health departments, public health dentists, and many others in the United States. Although written in non-technical language, the brochure described in some detail the genesis, method-

*First laid out in print by Franz Ingelfinger, then editor of the *New England Journal of Medicine*¹ and recently updated and amplified by Arnold Relman, its current editor,² the rule defines conditions of prior publication which proscribe publication by the *New England Journal of Medicine*.