

COMMENTARY

From Epidemiology to Policy: Toward More Effective Practice

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How can the best evidence on health and disease prevention in populations be brought to bear on policy making? How can epidemiologists help, or hinder, the cause? Are there lessons from recent U.S. experience that instruct us, perhaps even reveal a more general framework or lessons to apply to future opportunities?

Although these linkages between epidemiology and policy have been written about for more than two decades (1, 2), clear guidance has been lacking (3). For example, there has been a longstanding debate within the profession about how active epidemiologists should become in policy advocacy. Epidemiologists who take a public stance on a given health policy issue face the possibility of real or perceived loss of objectivity that may adversely affect their research on the same topic (4, 5). Others argue that involvement in policy making can enhance the practice of epidemiology by improving methods of synthesis (e.g., linking causal criteria to meta-analysis) or rigorously applying scientific methods to parts of the policy development process (6). Policy makers will continue to set health policy with explicit or implicit scientific input, and therefore, decisions are likely to benefit from epidemiologic evidence (7).

Throughout 2009, the American College of Epidemiology addressed these issues by holding a small workshop in the spring; by organizing symposia, lectures, and workshops throughout the Annual Meeting; and by presenting four case studies in this issue of *Annals*. These illuminate and summarize the experiences of epidemiologists and professionals in many other disciplines around reducing childhood obesity by increasing physical activity, decreasing ill health from secondhand exposure to cigarette smoke, setting policies to reduce traffic accidents from alcohol-

impaired driving, and compensating veterans fairly for exposures incurred during their service. Although no single translation template emerged, we concluded that careful efforts to record and assess the experiences move us toward more effective practice and policy.

The case study on obesity prevention illustrates the unintended harm to policy making that results from relying on a fixed hierarchy of evidence, one well-suited to establishing biologic cause but ill-suited to many other issues in the formation of public policy. For biologic cause, the hierarchy typically ranks experimental above observational data and prospective above retrospective data, when nearly always a mix is required to make good policy (8). Experiment serves to eliminate confounding but seldom mimics real world application. Prospective data often do not exist or take too long to gather. Similarly, observation of effects on individuals (e.g., body mass index) outrank more upstream end points (e.g., presence of a strong policy) for understanding biology, yet for many policy concerns, the natural unit of observation is made not at the individual level but instead at multiple levels of an ecologic framework. The authors of this case study therefore recommend that we develop more policy-relevant evidence on the basis of natural experiments and from this learn where there is a lack of evidence. They also urge that, in the face of considerable uncertainty on effectiveness, we consider what will be gained and what will be lost with action and inaction. One of the considerations for any action is the loss of opportunity to do something different with that effort and money. This concept, termed "opportunity cost," is rarely a consideration in biologic analyses but can be critical in discussions of policy.

The case on secondhand smoke picks up that thread with its lessons for answering the questions people ask, not the questions we think they ought to ask. For example, if public opposition raises the specter of economic harm to bars and restaurants, study that. Do it quickly and simply and get the results into the conversation. If technological alternatives are proposed as a substitute, encourage engineers to study those, and be open and objective in evaluating the results. If elected representatives or private or public figures assert that public opinion will not accept a proposed public health implementation, encourage opinion surveys to learn how the public currently views various features. Possibly because of decades of experience in attempting to reduce

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Selected Abbreviations and Acronyms:

BAC = blood alcohol content

tobacco exposures, epidemiologic practitioners in this field have learned the value of mixing epidemiology with all the other streams of evidence to make step-by-step progress in public health. This area has also been notable for the engagement of many epidemiologists into policy-making arenas at levels ranging from local to global, perhaps reflecting the strong role of epidemiological research findings in driving policy and the clear-cut need for action.

In the case on lowering the blood alcohol content (BAC) for drivers, the authors illustrate how a systematic review (in this instance, the *Guide to Community Preventive Services* [the *Community Guide*]) can have a powerful and lasting effect on national and state policy. Often effective policy is formed by the “perfect storm,” for instance, identifying an issue in which policy action may be warranted, working with a range of stakeholders, using a rigorous process to summarize scientific evidence, and having the right evidence, in the right person’s hand, at the right time.

For this case, alcohol-impaired driving is a significant and preventable public health problem. Many stakeholders have focused attention on this issue, including advocacy groups, public health leaders, and federal agencies. The methods of synthesis used by the *Community Guide* provided compelling scientific evidence showing that laws that limit the BAC of drivers to 0.08% were effective in reducing fatalities from alcohol-related motor vehicle crashes and had the potential to save 500 lives each year. The right person was a member of the team assembling the *Community Guide* review, who was able to transmit the findings from the systematic review to the head of the House Transportation Subcommittee that was considering a new standard for the allowable BAC of drivers. And the right timing was the “teachable moment” when *Community Guide* findings were available while the U.S. Congress was considering a change in the legal BAC level. There are many valuable lessons from this case study—among these, is that it is essential to have epidemiologic data on prepared when a policy “window” opens.

The fourth case study on compensation of veterans, poses a different challenge to epidemiology. In this arena, policy makers look to epidemiology for guidance on how compensation should be allocated to individuals rather than on how prevention should be provided across a population. Prevention strategies do not try to identify which individuals will benefit, but compensation must. Whether the claims they face are triggered by possible exposure to Agent Orange in Viet Nam or uncertain exposures in “Gulf War Syndrome,” policy makers need epidemiology

to determine whether it is reasonable to presume that a veteran has suffered an illness that may have been caused or exacerbated by his or her military exposures. One noteworthy feature of this case is the role of the impartial expert panel, in this case, a committee appointed by the Institute of Medicine. Expertise and impartiality and a collection of scientists undoubtedly aid the process of evaluating data, but it is clear that this approach does not eliminate controversy and does not provide a general template for policy-making.

This case study most closely resembles the challenges that emerge in the courtroom, where torts and other claimed harms must be evaluated. For these problems, the key issues come back to causality. Although epidemiologists have much more training that is relevant to the issues of causality, they can stumble if they fail to appreciate the different framework for judgment required. The authors propose a general four-outcome classification of the strength of evidence for causation, intended to facilitate decision-making around compensation: sufficient in favor of cause, sufficient against, above equipoise in favor, below equipoise in favor. This simple formulation leads to a clearer statement of what types of data are most needed next. Because the collection of data is always a cost, this approach focuses the attention on the right questions.

In summary, although the four case studies differ in their particular elements, they reveal common themes. Epidemiologists need to work with other experts, including advocates who care about the problem and those who make policy, along with other stakeholders. The public holds the largest stake because the ultimate purpose of epidemiologic research is to advance health. In the translation of scientific evidence, outcomes of the evaluation of data should be as observer-neutral as possible: if one unbiased expert panel following a set of decision rules reaches a particular conclusion, then another unbiased panel ought to reach approximately the same one. By contrast, good policy outcomes cannot be observer-neutral, since many values other than scientific evidence bear on the decisions (9, 10). Individual epidemiologists can choose to work at various places along a continuum from primary research that generates evidence to policy formulation that uses it wisely. Involvement in helping to set evidence-based policy does not intrinsically compromise the ability to conduct and evaluate research, but epidemiologists need to see that it could appear to. Training for epidemiologists ought to include some education in public health policy formulation and analysis. It would be wrong to expect epidemiologists to formulate policy as a simple result of their epidemiologic training and experience. Although numerous policy frameworks exist (3, 11–13), these four case studies show that each has utility and no single framework stands out as superior for translation of epidemiological evidence. Public health policies should be determined the basis of

epidemiologic and other evidence, and some epidemiologists see their role in advancing public health as ending with publication of their research findings. However, if all epidemiologists stop short of helping to affect policy, then the voice of science will be lost from making decisions that most affect the health of the public.

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