

Annotation: The Knowledge Base for Public Health Strategies

In this issue of the *Journal*, Atwood, Colditz, and Kawachi ask why scientific evidence takes so long to produce effective public health action.¹ They argue that the answer is supplied by the requirements for successful action put forth by Richmond and Kotelchuck²: scientific knowledge, political will, and a strategy to effect change. The knowledge amassed by public health researchers is only one leg of this three-legged stool and, no matter how conclusive, cannot succeed without a strategy and the political will to make it happen. As the authors describe it, scientific knowledge is the epidemiologic research that establishes the existence and causality of a relationship between a factor such as smoking or exercise and health outcomes.

What Atwood and colleagues neglect to point out is that the knowledge necessary for effective public health action goes well beyond epidemiology. Thus, some of the lag between the moment when definitive epidemiologic research is available and the moment when effective action is initiated can be explained by the time required to develop the rest of the knowledge base.

To develop a good strategy, decision makers need to know what strategies are available to attack the problem; how effective each strategy is (how much difference it makes and for whom); what it costs; what effects it has on people other than its intended beneficiaries; and how it compares in these respects with alternative strategies. It can be understandably difficult to generate political will to tackle even the most serious health problem if available strategies are ineffective, are very costly, or impose unacceptable risks on people who will not benefit.

Decision makers also need to know how even the best strategy aimed at a particular health problem compares with the use of resources for other health problems or for problems outside of health. Resources devoted to one use must be taken from some other use, established or proposed, whose claimants also feel strongly about their need. Loss of the benefits that could have been produced in the next-best use—what economists call the “opportunity cost”—is the true cost of choosing to invest in a particular strategy and should be kept as low as possible. Decision makers, who are in the business of balancing competing claims on re-

sources, need information that helps them evaluate the competitors.

Consider fortification of cereal grains with folic acid. It is well established that low levels of folic acid during pregnancy are associated with a higher incidence of neural tube defects in infants and that increasing folic acid levels reduces the incidence of these defects. Fortification of cereal grains is an effective strategy for delivering folic acid to women of child-bearing age: it is inexpensive, obviates the need to persuade women to take vitamin supplements, and delivers the nutrient even during the crucial first month when a woman may be unaware she is pregnant. Cost-effectiveness analysis shows that fortification at a level of 0.70 mg of folic acid per 100 g of cereal prevents more neural tube defects and costs less (when savings in future medical care are taken into account) than either an educational program to encourage the use of vitamin supplements or fortification at lower levels.³

Why then did the Food and Drug Administration (FDA) decide to fortify at 0.14 mg?⁴ It did so because folic acid can mask pernicious anemia in the elderly and has the potential to delay diagnosis until the neurological consequences have become irreparable.⁵ The elderly can avoid vitamin supplements, but cannot easily avoid fortified cereal grain products. The most effective strategy for pregnant women carries significant risks for others.

Research shows that even interventions of proven effectiveness can vary enormously in effectiveness and cost depending on how and to whom they are applied. For low-income elderly women who have not been screened in many years, if ever, a one-time Pap smear to detect cervical cancer saves lives and money.⁶ For women who are screened regularly, however, shortening the interval between tests from 3 years to 2, or from 2 years to 1, brings a small gain in life expectancy at very high cost.⁷ Medication to reduce cholesterol levels is a cost-effective way to extend life in people with heart disease (cost-saving in some), but in those without heart disease, even if we assume away the doubts about its effectiveness in reducing all-cause mortality, it is very expensive per year of life saved.⁸

In light of the need to evaluate alternative public health strategies, was the COMMIT trial a misallocation of

scarce resources, as Atwood and colleagues suggest? The test is not whether the results showed that the intervention is effective, but whether they helped guide resources to their best use. Discouraging investment in ineffective interventions is as useful to the development of good strategies as encouraging investment in interventions that are highly effective. The level of resources devoted should reflect not only the seriousness of the problem but also the ability of public health interventions to do something about it.

To help develop strategies that are in the public's best interest, research needs to account for all significant impacts, including some, such as individuals' time, that are conventionally ignored.⁹ For example, the ability of exercise to improve health, and perhaps to reduce medical expenditures, is frequently cited as reason enough for everyone to take it up. Yet little attention has been given to the very real problems, and costs, of making a suitable form of exercise easily available to people in all kinds of settings, in all kinds of weather, with all kinds of claims on their time. The matter of time, probably the most important resource required for exercise, is too often dismissed with the comment that anybody can find half an hour a day.

Some may argue that careful science has no place in the development of strategies, that these decisions are made quickly on the basis of gut evaluations of competing interests, all of which are clear, if not worthy. There is no time or need for such careful analyses. Indeed, interim decisions must and will be made (and, in and of themselves, are one way of discovering what works). But the COMMIT trial, the folic acid debate, and other examples show that there is both a need and a desire for information that helps people make better decisions.

In its 1988 report on the future of public health, the Institute of Medicine stressed that evaluation was one of government's most important public health functions. The report defined that function broadly, stating that government must “provide a central mechanism by means of which competing proposals can be assessed equitably.”¹⁰ The public health research community can contribute by

Editor's Note. See related article by Atwood et al. (p 1603) in this issue.

recognizing this need and both doing and encouraging research that produces more of the knowledge required for good decisions about public health strategies. □

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