

Researchers and Policymakers Travelers in Parallel Universes

Ross C. Brownson, PhD, Charles Royer, BS, Reid Ewing, PhD, Timothy D. McBride, PhD

Abstract: Public policy, in the form of laws, guidelines, and regulations, has a profound effect on our daily lives and health status. Reasons for a lack of consistent and systematic translation of public health research into public policy is examined, including differences in decision-making processes, poor timing, ambiguous findings, the need to balance objectivity and advocacy, personal demands of the process, information overload, lack of relevant data, and the mismatch of randomized thinking with nonrandom problems. Next, several actions are suggested that should help bridge the chasm between science and policy, such as greater involvement in the process, better understanding of political decision making, building of effective teams, and development of political champions. Scientists are obligated not only to discover new knowledge but also to ensure that discoveries are applied to improve health.

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Introduction

Public policy, in the form of laws, guidelines, and regulations, has a profound effect on our daily lives and health status. Public health research provides a foundation of scientific evidence on which to build public policy. For example, in a smoke-free work site, the clean indoor air is largely due to epidemiologic studies of secondhand smoke and lung cancer in nonsmokers.^{1,2} Numerous studies have shown that use of safety belts is the single most effective means of reducing fatal and nonfatal injuries in motor vehicle crashes and safety belt laws over the past few decades have prevented thousands of deaths.³

Others have written about the compelling linkages between research and public policy in advancing the health and well-being of populations.^{4–6} Indeed, Ter-ri⁴ has suggested that health policy should be based on public health sciences such as epidemiology. Even when research findings from research studies are clear and consistent, there are often multiple policy options.⁷ There is often little correlation between the quality of science and the policy derived from it.⁸ Research among senior policy advisors has lamented that “policy-

free” evidence is common and that many researchers do not see it as their responsibility to think through the policy implications of their work.⁹ This suggests that researchers need to communicate more broadly to a variety of audiences beyond other researchers.

When considering the connections between public health research and public policy, two important questions arise:

Why don't we see consistent and systematic translation of scientific studies into public policy?

How might the interactions between researchers and policy makers become more productive and relevant to the problems encountered in communities?

We seek to shed light on these and related questions. It is worth noting that in this article, a “policymaker” is an individual elected or appointed to office at some level of government. Also included are executive branch chiefs of staff and staff assistants who often play major roles in the policy process. New areas such as social determinants research^{10,11} recognize that many policies affecting health are developed and promoted in sectors outside of public health and medicine (e.g., economics, urban planning, housing, education, commerce).

What Are the Major Challenges?

The challenges in successfully translating scientific evidence into appropriate and effective public policy are substantial. To better understand the policy process, it is useful to consider the phases through which policies and programs pass over time.^{12,13} Brewer and deLeon¹² proposed a six-stage policy process (Table 1). This framework illustrates the complexity of policy science,

From the Department of Community Health and Prevention Research Center (Brownson), and Department of Health Management and Policy (McBride), Saint Louis University School of Public Health, St. Louis, Missouri; Urban Health Institute, School of Public Health and Community Medicine, University of Washington (Royer), Seattle, Washington; and National Center for Smart Growth Research and Education, University of Maryland (Ewing), Baltimore, Maryland

Address correspondence and reprint requests to: Ross C. Brownson, PhD, Department of Community Health and Prevention Research Center, Saint Louis University School of Public Health, Salus Center, 3545 Lafayette Avenue, St. Louis MO 63104. E-mail: brownson@slu.edu

Table 1. Policy analysis process

Phase	Examples of activities
Initiation	Creative thinking about a problem Definition of objectives Tentative and preliminary exploration of concepts, claims, and possibilities
Estimation	Thorough investigation of concepts and claims Scientific examination of impacts Normative examination of likely consequences
Selection	Debate of possible options Compromises, bargains, and accommodations Decisions among options
Implementation	Development of rules, regulation, and guidelines to carry out decision Translation of decision into operational terms Setting up program goals and standards, including schedule of operations
Evaluation	Comparison of expected and actual performance levels according to established criteria Assignment of responsibility for discovered discrepancies in performance
Termination	Determination of costs, consequences, and benefits for reductions or closures Amelioration as necessary and required Specification of new problems created during termination

Adapted from Brewer and deLeon.¹²

along with the many activities that may take place and the obstacles that may occur during any of the six phases.

In light of a complex and ever-changing process, eight major challenges follow to both scientific and policy-related professions.

Clash of cultures

Perhaps most importantly, the decision-making processes for researchers and policymakers are significantly different. This involves both the “real-world” steps in decision making (Figure 1) and differences in a number of characteristics that drive decisions (Table 2). Researchers rely on experimental and observational

studies to test specific hypotheses in a systematic way.^{14,15} Their influence is based on their specialized knowledge. On the other hand, policymaking is built on a history of related policies and demands from stakeholders.⁸ Policymakers have to sell, argue, advocate, and get re-elected in light of available political capital. Decisions are often the result of compromise. Their interests are often shorter term and keyed to an election cycle.

Even in light of sound scientific data, ideas are sometimes not ready for policy action due to lack of public support or competing policy issues. Policymakers face numerous challenges in a complex process that includes choosing the right policy action and ensuring

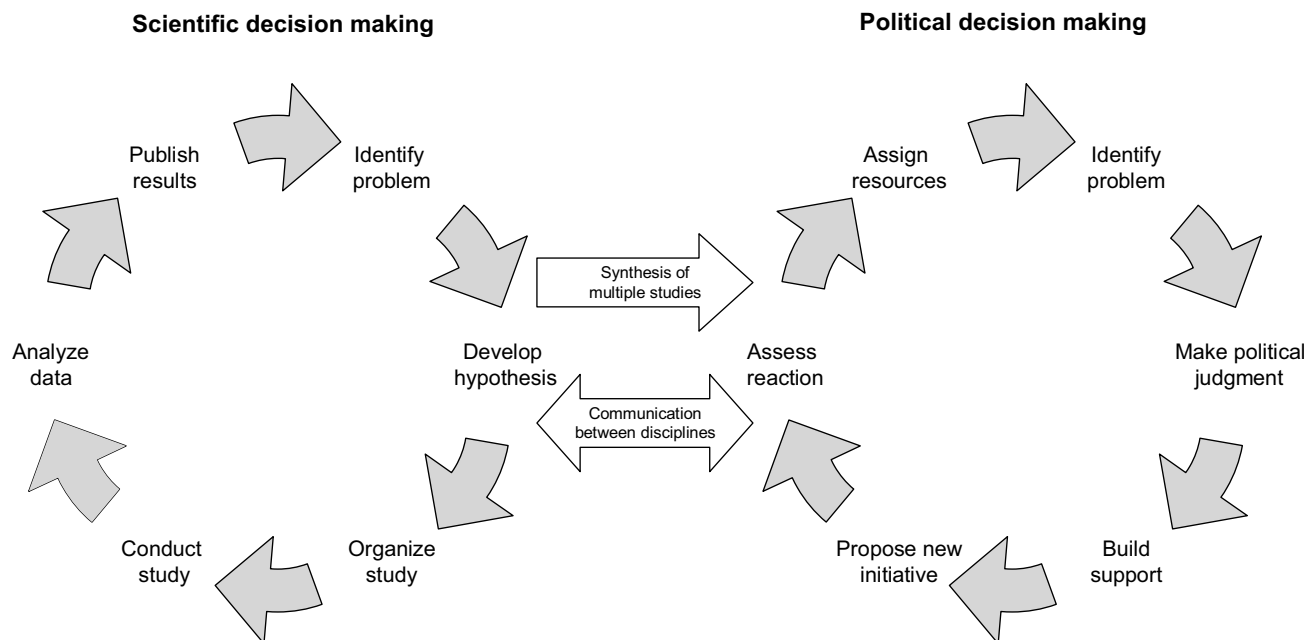


Figure 1. The “real-world” process of decision making in science and public policy.

Table 2. Differences in decision making and persuasion among researchers and policymakers

Characteristic	Researcher	Policymaker
Major incentive(s)	Grants, publications	Re-election, recognition
Opinion leaders	Leading scholars	Civic leaders, contributors, political leaders
Connection with advocates	Weak	Strong
Accountability	Editors, funders	Political parties, government, taxpayers
Knowledge span	Deep knowledge on narrow issues	Less in-depth knowledge on a wide array of issues
Willingness to accept uncertainty	Lower	Higher
Type of data relied on	Science, empirical studies	Science, the media, “real-world” stories, trusted advisors
Common methods of receiving information	Journals, scientific meetings	News media, staff, colleagues
Timeframe to action	Long	Short
Importance of disseminating results	Low to moderate	High

its implementation. The process often involves the important obstacles of dealing with the formulation of laws and rules, the court system, and the various bureaucracies within government. Termination of a policy, whether based on science or not, is often more difficult than initial enactment.¹⁶

Poor timing

Scientific studies are not always conducted at the right time to influence policy decisions.^{17–19} Research tends to progress in a deliberate, although not always predictable pace. The steps in the research cycle are shown on the left side of Figure 1. Frequently, research projects take 3 to 6 years to complete, and as many as 8 to 10 years may pass from the time of the initial hypothesis or research question to publication and dissemination of findings. Contrast this with the policy process, which moves much more quickly, and where public officials are elected every 2 to 6 years and often are dealing with hundreds of policy issues in a single legislative cycle. By the time that research findings are adequate to support policy changes, the political and social climates may not be receptive or the issues/problems may have subsided or disappeared from the venues of where public concerns are aired.

Ambiguous findings

Policymakers often become frustrated with the ambiguity of findings that researchers present (e.g., “confidence intervals” around their estimates). Policymakers prefer “point estimates” (e.g., a precise estimate) of the effect. For example, while projections of budget numbers for health programs—such as the numbers of persons who will be enrolled in these programs—are uncertain, policymakers often vote on the precise estimate of the number of people affected. The Congressional Budget Office, which is charged by the Congress to project future changes in the budget, has for years documented the difficulty in projecting future health costs of Medicare and has explained that their projec-

tions are uncertain.²⁰ Nevertheless, when Congress passed the Medicare Modernization Act, they passed the policy with a single point estimate of budget costs, not a range of budget estimates.

Balancing objectivity and advocacy

There have been considerable dialogue and disagreement among researchers regarding the degree to which scientists should be involved in the policymaking process. The differences focus largely on the role of scientists as advocates. Even the definition of advocacy is ambiguous,²¹ ranging from raising awareness of an issue, to communicating research results to policymakers, to actively lobbying for a particular policy. Some argue that researchers who take a public stance on a given health policy issue may face real or perceived loss of objectivity that may adversely affect their research.²² Objectivity implies that a researcher seeks to observe things as they are, without falsifying observations to match some preconceived view. Objectivity may be influenced by the research questions in which a researcher is personally interested.²³

Some argue that researchers have an obligation to be involved in policy development. In fact, the ethics guidelines of the American College of Epidemiology²⁴ call on epidemiologists to “report research findings in a timely, understandable, and responsible manner so that the widest possible community stands to benefit and (sometimes) serve as advocates on behalf of affected communities (without impairing scientific objectivity).” Despite reluctance of some scientists to be involved in policy development, a systematic review found that one of the most important facilitators of moving research into policy is personal contact between researchers and policymakers.²⁵

Personal demands

Involvement of scientists in the policy process brings with it personal demands. Involvement of a scientist in policy development takes time—this is time that may be

credited as “service” in the academic setting, but is unlikely to contribute substantially to career development (e.g., promotion, tenure, compensation). Anyone involved in a heated policy debate may be the target of personal attacks and harassment.²⁶ Policymakers willingly accept these risks when they run for public office.

Information overload

Multiple legislative and nonlegislative demands compete for the time of a policymaker, and the number of demands has grown at a steady pace over the years.²⁷ A fundamental tenet of the communication process is that people are limited in how much information they can process.^{28,29} A policymaker in the United States is typically exposed to hundreds of messages from multiple sources on a daily basis. A recent study of 292 state policymakers supported the notion that much of the information provided to policymakers is not assimilated. Among surveyed policymakers, 27% read the information they receive in detail, 53% skim the information for general content, and 35% “never get to” material.³⁰ Some have suggested that many policymakers “read people,” not written reports.³¹ This is a problem exacerbated by term limits, especially in state legislatures, where elected officials are not around long enough to develop expertise and are more subject to “expert” lobbyists. In addition, scientists may be ill-equipped to communicate complex information to policymakers in effective ways.³²

Lack of relevant data

Data can be persuasive and powerful in shaping policy decisions.^{33,34} However, epidemiologic data, whether from etiologic research or from surveillance systems, are often not in the form most useful for policymakers. Many data sets provide disease or risk factor data at the national, state, or county levels. Surveillance data are often compiled in reports that can be hundreds of pages in length. Yet policymakers often look for data that (1) show public support for a particular issue, (2) demonstrate priority for an issue over many others, (3) show relevance at the local (voting district) level, and (4) personalize an issue by telling a compelling story of how people’s lives are affected. In a political setting, a good anecdote or intuitive argument may carry more weight than a plethora of statistics or research results. Anecdotes are especially persuasive to the audiences that policymakers speak with (their constituents), who often are not sophisticated consumers of statistical evidence.³⁵

Data from Los Angeles and New York City have helped to shape the local public health agenda in part due to partnerships among local agencies, researchers, and policymakers.³⁴ The Canadian Cancer Society has called on the Canadian Parliament for increased sup-

port of cancer control, in part through publication of cancer data by local voting district (www.cancer.ca).

The mismatch of randomized thinking with nonrandom problems

In mainstream epidemiology, the most rigorous design for hypothesis testing is the randomized controlled trial.¹⁵ However, a randomized design is seldom useful in policy research because the scientist cannot randomly assign exposure (the policy) and problems are often qualitative. Thus, alternative research designs are often superior in framing policy-relevant questions.

There are two types of inquiry relevant to policy. First, a broad array of policy-relevant research contributes to policymakers’ understanding of what is likely to work. In this case, the information presented should be based on the best possible research.³⁶ Often, case studies are powerful tools for informing the policy process; these approaches are more often used in political science than in public health research. A second key type of policy research seeks to understand the impact(s) of a particular policy following enactment. In these studies, quasi-experimental designs (e.g., ecologic studies, time-series designs) are likely to be more useful than randomized experiments. A key issue in the evaluation of the impacts of policies is whether there is adequate variation in policy exposure among the target population.¹⁴

What Should Be Done?

These challenges, while substantial, are not insurmountable. There are numerous examples of fruitful collaboration and communication between scientists and policymakers. In many cases, these have resulted in the translation of scientific discoveries into meaningful policies. Several actions are suggested that should help bridge the chasm between science and policy, and examples are provided where these approaches have been applied.

Understand the Complexity and Drivers in Decision Making

Prevention of a public health problem is complex with a myriad of factors shaping the risk profile of a population.³⁷ Our biomedical models often seek to reduce causes into neat and clean pathways, yet as relevant policies take shape, it becomes clear that the world is complex with numerous policy options. Also, a vast literature in social psychology suggests that decision makers rely on habit, stereotypes, and cultural norms for the vast majority of decisions.³⁸ Someone working in the policy arena will quickly realize that science is only one of many important drivers in decision making.³⁹ The receptivity of policymakers to the inputs of

Table 3. Factors affecting receptivity of policymakers to inputs of health experts

Factor	Specific questions
Transparency of methods	Are the methods appropriate and transparent in their use and replication?
Plausibility of analysis	Does the analysis fit with the policymaker's analysis?
Experts' credentials	What are the personal credentials of the expert? What are the credentials and prestige of the institution that they represent?
Perceived impartiality	Has the researcher shown impartiality in reaching conclusions and policy steps? Who sponsored the expert's study? Does this create a conflict of interest?
Perceived track record	What are the expert's previous efforts?
Perceived honesty	Has the expert adequately expressed uncertainty in framing a conclusion?
Involvement of policymakers and stakeholders	Have the policymaker and/or stakeholders been included in development of policy solutions? Is the information from the expert locally relevant?

Adapted from Andrews,⁴⁰ Busenberg,⁴¹ Cash et al.,⁴² and Weiss.⁴³

health experts is driven by a set of factors that are now well-established through political and social science research^{40–43} (Table 3).

It is also important to distinguish between policies and the politics of science. As noted above, there are many factors beyond direct evidence that affect policy. Lobbyists and organized political opposition to a proposed policy may block legislation supportive of public health because their interests are threatened by the proposed policy.

Find a Way to Be Involved in the Process

The most effective public health agencies are not isolated from the policymaking process and make active use of data.^{44,45} To achieve this, researchers need to be aware of policymakers' concerns and windows of opportunity to change policy, and to be actively involved in the interchange between data and policy.^{46,47} While there are legitimate reasons for scientists to maintain some level of isolation from the policymaking process, policy implementation and research are viewed as a shared responsibility between scientists and policymakers. Policymakers need information in order to understand policy options and craft legislation.⁴⁸ In the absence of scientists' involvement in the policymaking

process, policymakers are likely to rely more heavily on vested interests (e.g., the food industry, the tobacco lobby), or nonscientists who may not have the public's health as their primary motivation or who may lack savvy in interpreting data. It may be useful to think of advocacy as a continuum with considerable overlap between categories; a scientist may seek her/his comfort level along this spectrum (Table 4). There are many examples where a broad-based set of individuals and agencies, often organized into coalitions, have improved public health. In tobacco control, a key driver in declining rates of tobacco use in many parts of the world is well-networked coalitions that have included scientists, health workers, and policymakers.⁴⁹

Communicate Information More Effectively

The former Speaker of the U.S. House of Representatives, Thomas (Tip) O'Neill, made famous the phrase "All politics is local." In that same light, the policy choices of elected officials are often designed to support their interest in being re-elected,⁵⁰ so data for policymaking must be locally relevant. For example, when sample sizes permit, it is probably more policy relevant to calculate statistics at the voting district or even precinct level than at the city or state level. Rates

Table 4. Actions across advocacy continuum

Raise the general awareness of issue ↔	Communicate findings to policymakers ↔	Actively lobby on behalf of particular issue
Publish a scientific article Publish a popular piece	Develop short policy summaries Transform epidemiologic data into forms readily understandable by policymakers Provide testimony at a legislative hearing	Form and activate community-based coalitions Learn and use media advocacy techniques
Present findings at a professional meeting Present findings at a community meeting Issue a press release	Educate legislative staff members on public health issues	Write for newspapers on a specific issue (letters to the editor and editorials) Meet with an elected official to get across a specific point of view Publicize the tactics of vested interests that are at odds with public health goals Support candidates who are of like mind

are often unstable at this level, but even absolute numbers can be persuasive. Innovations such as spatial data mapping (geographic information systems) allow for easy aggregation of data for diverse geographic locations and rapid visual display of data.⁵¹ Policymakers are more likely to read material that is broken down into bulleted and otherwise highlighted text and accompanied by charts or graphs illustrating key points.^{30,52} Narrative storytelling shows promise as a form of behavioral intervention for several populations and health conditions.^{53–56} The premise for this line of research is that storytelling makes messages personally relevant, motivation is gauged by personal susceptibility, and practical information is provided. Policymakers cite the impact on “real people” as one of the most important factors in increasing the coverage and relevance of research.³⁰ Attention is needed on how scientific data can be turned into compelling stories that are relevant to policymakers and the people who vote for them. Within a story, some of the most convincing types of evidence may contrast the costs of action versus those of inaction.⁹

A variation on this theme involves “case-wise analysis,”⁵⁷ in which individual cases are clustered by the similarity of impacts (e.g., the elderly because of the differential impact of air pollution on the incidence of emphysema in older populations) rather than analyzing highly aggregate statistics. In this way, vivid policy-relevant stories can be told with rigor rather than resorting to anecdote.

An illustration of the value of real stories comes from using case studies—presented on the Public Broadcasting System and widely disseminated in published form—of those without health insurance to illustrate the difficulties faced by the uninsured in accessing health care, the reasons why they lack health insurance, and the effects of the lack of health insurance on their health status.⁵⁸ These case studies showed that families often delayed treatment because of financial considerations, with significant impacts on their health status. A main reason that they were uninsured was because of working in marginal jobs. However, these stories illustrate the broader phenomenon found in the aggregate data, and thus are a useful illustrative tool.

Make Better Use of Analytic Tools

A variety of analytic tools are now available that may have positive impacts on the policymaking process. Systematic reviews, such as the *Guide to Community Preventive Services*,⁵⁹ sum up the results of primary scientific studies that meet explicit criteria. They provide an overview of current scientific literature through a definable and rigorous method in which available studies themselves are the units of analysis. Economic evaluation, commonly through cost-effectiveness studies, should be an important component of evidence-

based policymaking.⁶⁰ These methods provide information to help assess the relative appropriateness of expenditures on public health programs and policies. Cost-effectiveness compares the net monetary costs of an intervention with some measure of health impact or outcome (e.g., years of life saved).⁶⁰ In cost-benefit analysis, all of the consequences of the decision options are valued in monetary terms. Cost-benefit analysis addresses the question, “What is the overall economic trade-off between the policies?” Cost-benefit analysis is, however, rarely used to address health issues for a variety of reasons.⁶¹ Analysts in health care are rarely deciding whether to vaccinate children or build highways. Rather, they are trying to find ways to maximize health status and outcomes given a fixed number of healthcare dollars.

Health impact assessment (HIA) is a newer area of inquiry that attempts to prospectively estimate the potential impact of a policy or intervention on the health of the population. This approach has long been used for environmental issues and is gaining utility and acceptance for a broad range of health issues.^{62–64} An excellent illustration of the value of HIA comes from California, where researchers used estimates of the effects of health insurance and income on mortality to estimate and compare potential reductions in mortality attributable to the increases in wage and changes in health insurance status among workers covered by the Los Angeles City living wage ordinance.⁶⁵ Results showed that the health insurance provisions of the ordinance had a much larger health benefit than did the wage provisions, thus providing valuable information for policymakers who must decide how to allocate resources.

Educate Staffers on Science

A common mistake made by novices to the legislative process is assuming that it is always better to interact with elected officials themselves, rather than with members of their staffs.⁶⁶ Legislative staff members are the gatekeepers and opinion shapers for many public health issues; in brief, these individuals often have a great deal of influence in forming the priorities of an elected official. Therefore, it is often important to develop a positive working relationship with his/her legislative staffer(s) and to build their knowledge and understanding of evidence-based approaches to policymaking. Interestingly, legislative staff seem to prefer longer, detailed reports, whereas elected officials themselves prefer short summaries.³⁰

While legislators are more prone to use and consume what Peterson³⁵ calls “ordinary” knowledge (e.g., personal experience, anecdotes, letters, phone calls), legislative staff are better equipped in recent years to receive whatever information analysts can provide, and with increasing sophistication, and this is described by

Peterson³⁵ as “distributional” and “policy-analytical” knowledge. For example, in the recent debate over the implementation of the Medicare Modernization Act of 2003, congressional staff turned to policy analysts with sophisticated questions about the impacts of policy changes on individuals and institutions.⁶⁷

Develop Systems for Policy Surveillance

Public health surveillance is a cornerstone of public health,⁶⁸ yet policy initiatives have not been a central focus of surveillance systems. When implemented properly, policy surveillance systems can be an enormous asset for the policy development process and for policy evaluation. For example, the National Cancer Institute’s State Cancer Legislative Database tracks various types of cancer-related state legislation and is a valuable tool for practitioners and researchers who are implementing and evaluating policy initiatives. These systems allow for the linkage of data on state tobacco policy with outcomes such as youth smoking or exposure to secondhand smoke.^{69,70}

Conduct Policy Research

Rich opportunities for policy research may take a number of forms including: (1) identifying relevant policies (surveillance), (2) understanding the determinants of establishing policy, (3) exploring the process of developing and establishing policy, and (4) assessing the outcomes of policy implementation. In these studies, the policy can be either the independent or dependent variable. As noted earlier, often the most fruitful designs for policy research are less often used by public health researchers. For example, some of the most powerful information on the policy process comes from single or multiple case studies. Case studies allow one to observe changes in real-life settings, can guide future programs, and are most useful when the investigator has relatively little opportunity to manipulate the behavior of interest (e.g., non-experimental conditions).⁷¹

A recent example of cross-case comparison research comes from Europe where scholars investigated the perceived and objective “built” environment across Finland and Germany, and how it encourages or inhibits physical activity participation.⁷² A key aspect of the study was to determine whether a policy orientation (i.e., strategies, policy statements, committee reports, funding, the will of the government) is related to activity. Results were described both quantitatively and qualitatively, showing that a policy orientation encouraging physical activity for the whole population appears to be related to better opportunities for sports and recreation as well as stronger physical infrastructure.

Improve Training and Education Programs

Better competencies are needed in numerous areas relevant to policy development, implementation, and evaluation. Many public health training programs do an excellent job in educating students on analytic methods yet lack more applied skills. For example, for epidemiologists in practice settings, key skills include skills in working with the media, writing concisely in straightforward language, and developing compelling presentations.^{73,74} Some organizations have taken on the task of training researchers to communicate more effectively with policymakers. For example, Research! America⁷⁵ has sponsored a series of meeting and trainings to demonstrate the value of academic, industry, and government research. These meetings have targeted both academic researchers and policy advocates.

Build Appropriate, Transdisciplinary Public Health Teams

Savitz et al.⁷⁶ have suggested the need to develop a broad definition of public health that includes a diverse array of actions and teams that may include policymakers, health department officials, epidemiologists, and others. In part this is essential because science tends to be compartmentalized, with each subdiscipline possessing its own culture, language, and funding streams.³² The challenge of complex problems faced by public health requires not only the involvement of the right people but also a variety of sectors (e.g., education, transportation, economics).⁷⁷ Coalitions and partnership are often a key vehicle for bridging these sectors.^{78,79}

A good example of transdisciplinary research and communication comes from the work on health effects of electric and magnetic fields (EMFs). In studying EMFs, expertise is required from many disciplines, including epidemiology, exposure assessment, toxicology, endocrinology, cell biology, and physics.⁸⁰ To effectively communicate complex risk estimates related to EMF exposure to policymakers, public health officials need experts in risk communication who understand the perception of involuntary risk, the role of the media, and weighing of societal risks and benefits.

Cultivate Political Champions

Getting a bill passed takes more than outside pressure. It often takes someone applying pressure “from the inside.” A political champion is one who is not only willing to support a bill, but is willing to use her or his passion and influence to garner support from colleagues. The importance of political champions is widely recognized.^{27,81} In the health advocacy arena, for example, one powerful member of the Transportation and Infrastructure Committee of the U.S. House of Representatives has become a champion of walking and

bicycling interests. He has developed a particular concern about physical inactivity and obesity in children. As a result, he has pledged to include a \$1 billion "Safe Routes to School" program in the new federal surface transportation act. This bill recently passed both houses of Congress at the level of \$612 million.

Summary

Closer linkages between public health researchers and policymakers are essential if we are to address issues of societal importance and thereby enhance the health of populations. While the distinctions between scientists and policymakers highlighted in this paper may be oversimplified to a degree, the dichotomy also seeks to identify common ground. Researcher-policy connections can take several forms and do not necessitate that scientists lose their objectivity and scientific credibility.⁸² It is possible to have socially responsible science that balances the rigor of science with the essential need for advocacy and political action.⁸³ The development, implementation, and evaluation of public policies should be viewed as a shared responsibility among researchers, elected officials, advocates, and citizens. It is a fundamental obligation of a scientist not only to discover new knowledge but also to ensure that discoveries are applied to improve health and well-being.

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