

# Evidence-Based Decision Making in Public Health

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*A stronger focus on evidence-based decision making in day-to-day public health practice is needed. This article describes the rationale for this need, including (1) the inter-relationships between evidence-based medicine and evidence-based public health (EBPH); (2) commonly used analytic tools and processes; (3) keys to when public health action is warranted; (4) a strategic, six-step approach to more analytic decision making; and (5) summary barriers and opportunities for widespread implementation of EBPH. The approach outlined is being tested through a series of courses for mid-level managers in the Missouri Department of Health—initial results from a pilot test are encouraging. It is hoped that the greater use of an evidence-based framework in public health will lead to more effective programs.*

Key words: *data, decision making, epidemiology, public health practice, surveillance*

**T**HE MANY accomplishments of modern public health can be lauded, including the 30-year gain in life expectancy in the United States during this century. Much of this increase can be attributed to the provision of safe water and food, sewage treatment and disposal, tobacco use prevention, injury prevention, control of infectious diseases through immunization, and other population-based, public health interventions.<sup>1</sup> Despite these successes, many additional public health challenges remain. To meet and exceed expectations for continuing improvement, a drive for more wide-

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As noted in this article, a course entitled Evidence-Based Decision Making in Public Health is taught for public health practitioners in Missouri. Copies of the syllabus and readings for the course are available from Dr. Brownson (brownson@slu.edu). Information on other information system strategies that are being implemented within the Missouri Department of Health is available from Mr. Land.

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spread use of evidence-based strategies for effectively addressing current challenges in public health is needed.

Ideally, public health practitioners always incorporate scientific evidence in making management decisions, developing policies, and implementing programs. However, in reality, these decisions often are based on short-term demands rather than long-term study, and policies and programs are developed frequently around anecdotal evidence. These concerns were noted a decade ago when the Institute of Medicine (IOM) determined that decision making in public health often is driven by "...crises, hot issues, and concerns of organized interest groups."<sup>2(p.4)</sup> In addressing these issues, many factors may lead to a more evidence-based approach to decision making, including enhanced individual skills, wider use of data and analytic tools, and a more favorable organizational climate.

In this article, the authors describe: (1) the interrelationships between evidence-based medicine (EBM) and evidence-based public health (EBPH), including examples from contemporary public health practice; (2) commonly used analytic tools and processes; (3) keys to when public health action is warranted; (4) a strategic approach to decision making that currently is being tested in Missouri; and (5) summary barriers and opportunities for widespread implementation of EBPH. A major goal of this discussion is to move the process of decision making toward a pro-active approach that incorporates effective use of scientific evidence and data.

## Inter-Relationships between EBM and EBPH

### Evidence-based medicine

The concept of EBM has grown in prominence in recent years.<sup>3,4</sup> EBM involves the delivery of optimal individual patient care through the integration of current best evidence on pathophysiological knowledge, cost effectiveness, and patient preferences. Necessary EBM skills include the ability to track down, critically appraise, and rapidly incorporate scientific evidence into a clinician's practice. Key steps in the EBM process<sup>5</sup> include the abilities to:

1. convert information needs into answerable questions

2. track down, with maximum efficiency, the best evidence with which to answer these questions (from the clinical examination, the diagnostic laboratory, the published literature, or other sources)
3. critically appraise that evidence performance for its validity (closeness to the truth) and usefulness (clinical applicability)
4. apply the results of this appraisal in clinical practice
5. evaluate performance

### Uses of evidence in public health decision making

The authors define EBPH as the development, implementation, and evaluation of effective programs and policies in public health through application of principles of scientific reasoning including systematic uses of data and information systems and appropriate use of program planning models. In EBPH, the most viable approach to a public health problem is chosen from among a set of rational alternatives. This process relies on several related disciplines including epidemiology, biostatistics, behavioral sciences, health economics, and health care management. Any process or method that is established should recognize that public health practitioners often have substantial administrative duties; therefore, EBPH must be time efficient. Two examples from contemporary public health practice help to illustrate decisions based on varying degrees of evidence.

In the field of tobacco control, decades of research and thousands of epidemiologic studies have established cigarette smoking as the "leading cause of preventable premature death"<sup>6(p.10)</sup> Economic studies have shown that increased tobacco taxes are an important tool for decreasing tobacco consumption.<sup>7</sup> To address the issue, California voters passed an earmarked tobacco excise tax in 1988.<sup>8</sup> California raised the excise tax on cigarettes by 25 cents per pack and placed an initial tax of 42 cents on other tobacco products, with the rate on other tobacco products adjusted annually by the State Board of Equalization. This effort launched one of the most intensive and aggressive public health interventions ever undertaken.<sup>9</sup> This excise tax and media campaign were effective in sharply accelerating the drop in both sales of cigarettes and in smoking (for 1988–1993, which

was double the rate expected based on the 1974–1987 trend).

A second example involves the implementation and evaluation of a Missouri program designed to decrease motor vehicle injuries and deaths among children. In addressing this issue, the Missouri legislature enacted a child restraint law in 1984. The law required children younger than age 4 to travel in an approved safety seat in the front seat of a vehicle or in either a safety seat or seatbelt in the back seat. Even eight years after enactment, compliance was estimated at only 50 percent.<sup>10</sup> In response to concerns from health care providers and safety organizations, the Missouri Department of Health began the Take a Seat, Please! (TASP) Program in 1992, modeled after a similar program in Virginia.<sup>10</sup> For the TASP program, volunteers were provided with business-reply postcards on which they could report the license plate number of a vehicle in which a child was not restrained properly. The owner of the vehicle then was sent a letter from the health department stating that the recipient had been observed breaking the law, where and when the observation had taken place, information on child passenger safety, and program information through a toll-free number. Two years after implementation, the TASP program was evaluated through a telephone survey of participants and observational studies in child care centers.<sup>10</sup> The findings showed little evidence of program effectiveness; therefore, it was discontinued in September 1995. Similar approaches have been adopted in at least 15 other states with little supporting evidence of effectiveness.

### Contrasting EBM and EBPH

There are important distinctions between EBM and EBPH. First, the quality and volume of evidence differ. Medical studies of pharmaceuticals and procedures often rely on randomized controlled trials, the most scientifically rigorous of epidemiologic studies. In contrast, public health interventions frequently rely on cross-sectional and quasi-experimental designs lacking any “true” comparison group, which may limit the quality of the evidence. During the past 50 years, there have been approximately 1 million randomized controlled trials of medical treatments.<sup>3</sup> There are fewer studies of the effectiveness of public health interventions. Second, public

health studies often encounter a longer time period between intervention and outcome. An intervention to reduce smoking may have the ultimate outcome of reducing lung cancer deaths, yet it would take decades to evaluate this long-term endpoint. Third, the formal training of persons working in public health is much more variable than that in medicine. Unlike medicine, public health relies on a variety of disciplines and there is not a single (or even small number of) academic credential(s) that “certifies” a public health practitioner.

In light of these issues, two key questions are: (1) What are some useful tools and processes for evaluating public health evidence? and (2) When is evidence sufficient for public health action?

### Analytic Tools and Processes for Evaluating Evidence

Several important tools and processes are available to practitioners to assist in determining when public health action is warranted. This section provides a very brief overview of five of these.

#### Meta-analysis

Meta-analysis is a quantitative approach that provides a systematic, organized, and structured way of integrating the findings of individual research studies.<sup>11,12</sup> In a meta-analysis, the study results become the unit of analysis, with the goal of identifying consistent patterns and sources of disagreement among results.<sup>13</sup> Meta-analysis has been used increasingly during the past two decades to synthesize the findings of multiple independent studies and has been called “...possibly the most important policy-related research method that has developed in the past two decades.”<sup>14(p.229)</sup> Detailed descriptions of how to conduct meta-analysis are described in detail elsewhere.<sup>11,14</sup>

#### Risk assessment

Quantitative risk assessment is a widely-used term for a systematic approach to characterizing the risks posed to individuals and populations by environmental pollutants and other potentially adverse exposures.<sup>15,16</sup> Risk assessment has been described as a “bridge” between science and policy making<sup>17</sup> and it has become an established process through which expert scientific input is provided to agencies that

regulate environmental or occupational exposures. In the United States, its use is required either explicitly or implicitly by a number of federal statutes and its application worldwide is increasing. There has been considerable debate over the U.S. risk assessment policies and the most widely recognized difficulties in risk assessment are due to extrapolation-related uncertainties, specifically, extrapolating low-dose health effects from higher exposure levels.

### **Economic evaluation**

Economic evaluation, commonly through cost-effectiveness studies, should be an important component of evidence-based decision making.<sup>18</sup> 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 (for example, years of life saved).<sup>19,20</sup>

An example of a cost-effectiveness analysis in relation to a public health intervention was shown by Hatzianreou et al,<sup>21</sup> who assessed the benefits of regular exercise among a cohort of 1,000 35-year-old men. They estimated that regular exercise would result in 78 fewer coronary heart disease deaths and 1,138 quality-adjusted life years (QALY) gained in this cohort. The cost per QALY was favorable compared with other preventive or therapeutic interventions. In public health practice, a continuing challenge is the difficulty in measuring cost effectiveness for community-based interventions because cost data often are not reported and indirect costs (for example, lost work productivity) are difficult to measure.

### **Public health surveillance**

Public health surveillance involves the ongoing, systematic collection, analysis, and interpretation of outcome-specific health data, which are closely integrated with the timely dissemination of these data to those responsible for preventing and controlling disease or injury.<sup>22</sup> A viable surveillance system can provide a wealth of valuable information for decision making in public health. Public health surveillance systems should have the capacity to collect and analyze data, disseminate data to public health programs, and regularly evaluate the effectiveness of the use of the disseminated data.<sup>23</sup> For example, docu-

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mentation of the prevalence of elevated levels of lead (a known toxicant) in blood in the U.S. population has been used as the justification for eliminating lead from gasoline and for documenting the effects of this intervention.<sup>24</sup>

### **Expert panels and consensus conferences**

Most government agencies, in both executive and legislative branches, and voluntary health organizations utilize expert panels when examining scientific studies based on explicit criteria and determining their relevance to health policies and interventions.<sup>25</sup> Ideally, the goal of expert panels is to provide scientific peer review of the quality of the science and scientific interpretations that underlie public health recommendations, regulations, and policy decisions. When conducted well, peer review can provide an important set of checks and balances for the regulatory process. One of the successful outcomes of expert panels has been the production of guidelines for preventive medicine.<sup>26</sup> In related work, the Council on Linkages between Academia and Public Health Practice has concluded that “the potential benefits of public health practice guidelines are immediate and far reaching.”<sup>27,28(p.5)</sup> These recommendations have helped to stimulate a current effort to develop a *Guide to Community Preventive Services*.<sup>29</sup> This guide will document the effectiveness of a variety of population-based interventions in public health through systematic review and evaluation of the scientific evidence.

Consensus conferences are a related mechanism commonly used to review epidemiologic evidence. Expert panels can take time (sometimes years) to develop their recommendations, while the consensus panel commonly must make decisions within a conference held over two and one half days. Thus, the “consensus” of many consensus panels occurs in the middle of the night to meet a deadline imposed by the conference.<sup>30</sup>

## Determining When Evidence Is Sufficient for Action

One of the key and difficult issues in public health is determining when evidence is sufficient for public health action (in the form of a specific program or policy) and what the specific action should entail. It may be useful to consider two levels of evidence. The first involves analytic data that shows the importance of a particular health condition and its link with some preventable risk factor. For example, a large body of research shows that the burden of childhood illness and death can be reduced significantly through widespread immunization.

Factors important to consider include the condition's magnitude (number, incidence, or prevalence), severity (morbidity, mortality, or disability), and preventability (what can be done to prevent the health condition). This type of evidence, level one evidence, may lead one to the conclusion that "*something* should be done." The second level of evidence focuses on the relative effectiveness of specific interventions to address a particular health condition. For example, in relation to immunizations, which is a more effective and cost-effective strategy: provider feedback and reminders, parental reminders and education, or school and daycare immunization laws? This type of evidence, level two evidence, points the practitioner toward the conclusion that "*specifically*, this should be done."

Whether considering level one or level two evidence, the impetus for action is strengthened by consistent findings from a series of well-conducted studies. When considering such a series, the practitioner should examine each individual study for its strength of design and execution (internal validity) as well as its ability to generalize findings to other populations (external validity). In the end, public health decisions must integrate the full array of considerations regarding risks and benefits of different courses of action. These considerations should not be limited to the scientific evidence but should also include social, cultural, economic, and political factors.

## A Sequential Framework for Practitioners

To foster an enhanced approach to EBPH, the Missouri Department of Health convened a work group

in 1996 with the main goal of developing a sequential framework and training course for busy public health practitioners that would lead to greater use of evidence in day-to-day decision making. This section briefly describes the six-stage EBPH process developed by the workgroup that the authors believe will be useful in addressing a variety of public health program and policy decisions. It is important to note that this process is seldom a strictly prescriptive or linear one, but should include numerous feedback "loops" and may benefit from strategies outlined in other program planning models.<sup>31,32</sup> Through this iterative process, the authors have noted that an additional benefit of EBPH is the potential to build multidisciplinary teams that engage practitioners in problem solving. As with any analytical process, practitioners should maintain a "healthy skepticism" in approaching an issue or problem.

### Stage one: develop an initial, concise, operational statement of the issue

The practitioner should begin by developing a concise statement of the issue or problem being considered. To build support for any issue (with an organization, policy makers, or a funding agency), the issue must be articulated clearly. In many senses, this problem definition is similar to the beginning steps in a strategic planning process, which often involves describing the mission, internal strengths and weaknesses, external opportunities and threats, and the vision for the future.<sup>33,34</sup> The key components of an issue statement include the health condition or risk factor being considered, the population(s) affected, the size and scope of the problem, prevention opportunities, and potential stakeholders.

The following example is provided for an issue commonly encountered in public health practice—infant mortality.

*Background/Public Health Issue.* Based on epidemiologic data, the rate of infant mortality in state X has decreased by 5 percent during the past five years. Despite this trend, the rate remains among the highest in developed countries.

*Programmatic Issue.* The state health department has been charged by the governor with developing a plan for reducing the rate of infant mortality. This plan must be developed within six months and implemented within 12 months.

*Solutions Being Considered.* Program staff, policy makers, and advisory groups have proposed numerous solutions, including: (1) increased funding for family planning services, (2) a mass media campaign to encourage better prenatal care, and (3) global policies that are aimed at increasing health care access for pregnant women.

### **Stage two: determine what is known through the scientific literature**

After the issue to be considered has been defined clearly, the practitioner needs to become knowledgeable about previous or ongoing efforts to address the issue. This should include a systematic approach to identify, retrieve, and evaluate relevant reports on scientific studies, panels, and conferences related to the defined topic of interest. The most common method for initiating this investigation is a formal literature review. There are many databases available to facilitate such a review. Most common among databases for epidemiology and public health purposes are MEDLARS, MEDLINE, PubMed, Current Contents, HealthSTAR, and CancerLit. These databases can be subscribed to by an organization, can be found selectively on the Internet, or sometimes can be accessed by the public through institutions (such as the National Library of Medicine, the Combined Health Information Database, universities, and public libraries). There also are many organizations that maintain Internet sites that can be useful for identifying relevant information including many state health departments, the Centers for Disease Control and Prevention (CDC), and the National Institutes of Health (NIH). The methods for conducting a formal literature search can be found elsewhere.<sup>11,35,36</sup>

After relevant articles and reports have been identified and retrieved, an evaluation of the information should be conducted. Depending on the specific purpose of the review, this may take the form of a systematic analysis and synthesis<sup>11,35,36</sup> Such a synthesis can be primarily qualitative, in which the analytic results are reviewed carefully with respect to the validity of the studies, the generalizability of the results beyond the study populations, and the applicability of the findings in the context of the specific problem definition that originated the review. As described earlier, the synthesis also can be quantitative, in the form of a meta-analysis.

### **Stage three: quantify the issue**

After developing a working understanding of the current state of knowledge regarding the public health problem of interest through the literature review, a second type of search usually is warranted, one in which sources of existing data are identified. Such descriptive data may be available from ongoing vital statistics data (birth or death records), surveillance systems, special surveys, or from national studies.

Descriptive studies can take several forms. In public health, the most common type of descriptive study involves a survey of a scientifically valid sample (a representative cross section) of the population of interest. These “cross-sectional” studies are not intended to change health status (as an intervention would), but rather, they serve to quantify the prevalence of behaviors, characteristics, exposures, and diseases at some point (or period) of time in a defined population. This information can be valuable for understanding the scope of the public health problem at hand. Descriptive studies commonly provide information on patterns of occurrence according to such attributes as person (for example, age, gender, ethnicity), place (such as county of residence), and time (for example, seasonal variation in disease patterns). Additionally, under certain circumstances, cross-sectional data can provide data for use in the design of analytic studies and can be used as baseline data to compare the effectiveness of public health interventions.

Analytic studies are designed to evaluate specific scientific hypotheses, although they too may serve descriptive goals. If the objective of a given study is to quantify the degree to which a suspected risk factor contributes to the disease burden in a defined population, then case-control and cohort study designs should be considered. Results from these types of studies can be used to generate information needed to judge whether a suspected risk factor is related causally to a disease (or other outcome), thus justifying public health intervention. If such causality is established, analytic epidemiologic studies also can be used to quantitatively describe the preventive effect that could be expected if the risk factor in question was reduced or eliminated in the target population (population-attributable risk). On the other hand, more commonly in public health prac-

tice, the objective of the study is to change some behavior or practice that is understood to be deleterious to public health. Therefore, intervention studies are designed and implemented. These may involve either experimental or quasi-experimental studies and may involve small numbers of individuals or larger population bases such as schools or entire communities.<sup>37</sup>

#### **Stage four: develop program or policy options**

In the next step, a variety of health program or policy options are examined. The list of options can be developed from a variety of sources. The initial review of the scientific literature can sometimes highlight various options. More often, expert panels provide program or policy recommendations on a variety of issues. There are several assumptions or contexts underlying any development of options. These considerations focus on five main areas: political/regulatory, economic, social values, demographic, and technological.<sup>34</sup>

In particular, it is important to assess and monitor the political process when developing policy options. To do so, “stakeholder” input may be useful. The stakeholder for a policy might be the health policy maker, whereas the stakeholder for a coalition-based community intervention might be a community member. In the case of health policies, supportive policy makers frequently can provide advice regarding timing of policy initiatives, methods for framing the issue, strategies for identifying sponsors, and ways to develop support among the general public. In the case of a community intervention, additional planning data may include key informant interviews, focus groups, or coalition member surveys.<sup>38</sup> Several of these planning issues also are a part of the science of policy analysis.<sup>39</sup>

In developing options, it is useful to remember that many public health interventions are founded on the notion that action at the level of a social unit can improve health outcomes at the individual level. This notion is embodied in a *causal model*—one that leads from program inputs (programs and resources) to health outputs (changes in health behaviors or health status) if the program works as intended and one that guides program planners in designing interventions. It is important for evaluation purposes that what has been termed this “small theory” of the intervention be made explicit early in the planning

process.<sup>40</sup> The causal framework should lead toward explicit determination of mutable and immutable factors, assisting in option development.

#### **Stage five: develop an action plan for the program or policy**

This aspect of the process again deals largely with strategic planning issues. Key issues are covered here briefly, with more extensive discussions by others.<sup>33,41,42</sup> When an option has been selected, a set of goals and objectives should be developed. A goal is a long-term, desired change in the status of a priority health need and an objective is a short-term, measurable, specific activity that leads toward achievement of a goal.<sup>41,42</sup> The course of action describes how the goals and objectives will be achieved, what resources are required, and how responsibility of achieving objectives will be assigned. Excellent examples exist that show how to construct strategic goals and objectives with a “fill in the blank” format.<sup>43</sup> It is important that objectives are:<sup>42</sup>

1. performance, behavior, or action oriented
2. precise in their language (do not use general or vague verbs)
3. measurable
4. results oriented with stated outcomes
5. clear in their description of content and performance
6. tied to specific time tables for completion.

#### **Stage six: evaluate the program or policy**

In simple terms, evaluation is the determination of the degree to which program goals and objectives are met. Most public health programs and policies are evaluated through “quasi-experimental” designs, for example, those lacking random assignment to intervention and comparison groups. More complete descriptions of research designs can be found elsewhere.<sup>44,45</sup> In general, the strongest evaluation designs acknowledge the roles of both quantitative and qualitative evaluation. Furthermore, evaluation designs need to be flexible and sensitive enough to assess intermediate changes, even those that fall short of changes in behavior. Genuine change takes place incrementally over time, in ways that often are not visible to those too close to the intervention. Several important considerations for evaluating community-based interventions are shown in Table 1.<sup>46</sup>

**Table 1**

A summary of evaluation principles and tools

Principle	Tool
Community programs should include an assessment of program theory	Logic models
Instruments that are used to measure community programs must be contoured to each individual community	Questionnaires and surveys Social indicators
Approaches should be guided by the questions asked and often require both a quantitative and qualitative orientation	Experimental and quasi-experimental designs Qualitative designs
Evaluation should be informed by social ecology and social system concepts	Ecology and systems designs
Community evaluation should involve local stakeholders in meaningful ways	Participatory planning

Source: Adapted from Goodman, R.M. "Principles and Tools for Evaluating Community-Based Prevention and Health Promotion Programs." *Journal of Public Health Management and Practice* 4, no. 2 (1998): 39.

***Measuring the impact of a program or policy should rely commonly on three inter-related levels of evaluation: process, impact, and outcome.***

Measuring the impacts of a program or policy should rely commonly on three inter-related levels of evaluation: process, impact, and outcome. The authors will discuss briefly potential contributions of each type of evaluation, with a more comprehensive discussion available.<sup>32,47</sup> Initially, one should seek to determine which (if any) changes have occurred as the result of a particular intervention. This often involves *process evaluation*—the analysis of inputs and implementation experiences to track changes as a result of a program or policy.<sup>32</sup> Process evaluation occurs at the earliest stages of a public health intervention and often is helpful in determining “mid-course corrections.” *Impact evaluation* can be considered a subset of outcome evaluation that assesses whether intermediate objectives have been achieved. Indicators may include changes in knowledge, attitudes, or risk factor prevalence.<sup>32</sup> The long-term measures of effects rely on *outcome evaluation* such as changes in morbidity, mortality, and quality of life. As discussed earlier, economic evaluation often is an

important component of an overall evaluation plan.

The usual sources of measurement error should be considered when developing and implementing an evaluation plan, for example, validity and reliability. The most useful community-based interventions show high internal validity (for example, whether the observed results be attributed to the program or intervention). Further, external validity relates to whether the observed results can be generalized to other settings and populations. Reliability (or reproducibility) refers to the extent to which the same measurement is obtained on the same occasion by the same observer, on multiple occasions by the same observer, or by different observers on the same occasion. An additional source of error in community-based interventions may result from inadequate implementation (a so-called type III error).<sup>48</sup>

### Testing the Sequential Approach in a Public Health Agency

Using the approach outlined above, the authors recently pilot tested a new course in evidence-based public health with 12 mid-level managers in the Missouri Department of Health. Participants took part in a four-day course that included didactic presentations, case study exercises, and hands-on computer lab instruction. Following the course, a written evaluation was conducted. For the overall course

evaluation, the following statements each received mean scores between 8.5 and 9.3 (on a 10-point scale where 1 and 10): (1) “the course had clearly stated objectives;” (2) “the course objectives and course content were related appropriately;” (3) “course objectives were achieved;” (4) “I learned new information;” and (5) “I can apply what I learned to my job. In addition, 10 of 12 participants stated they would use the course information in their day-to-day work (two were unsure). Based on this positive initial evaluation, plans are underway to revise the course content and to offer it among a wider audience within the state health department.

**Barriers and Enablers**

Through this effort, the authors have identified several potential barriers that may impede the ability of an organization to implement EBPH (Table 2). Possible approaches for overcoming these barriers have been discussed by others.<sup>2,49,50</sup> Leadership is needed from public health practitioners on the need and importance of EBPH. Such leadership is evident in

training programs such as the regional leadership network for public health practitioners<sup>51</sup> and the efforts underway to develop evidence-based guidelines for interventions.<sup>29</sup> To address the gap between curricula in academic institutions and “real world” needs, the Public Health Faculty/Agency Forum developed a useful set of universal and discipline-specific competencies and recommendations.<sup>52</sup>

**Summary**

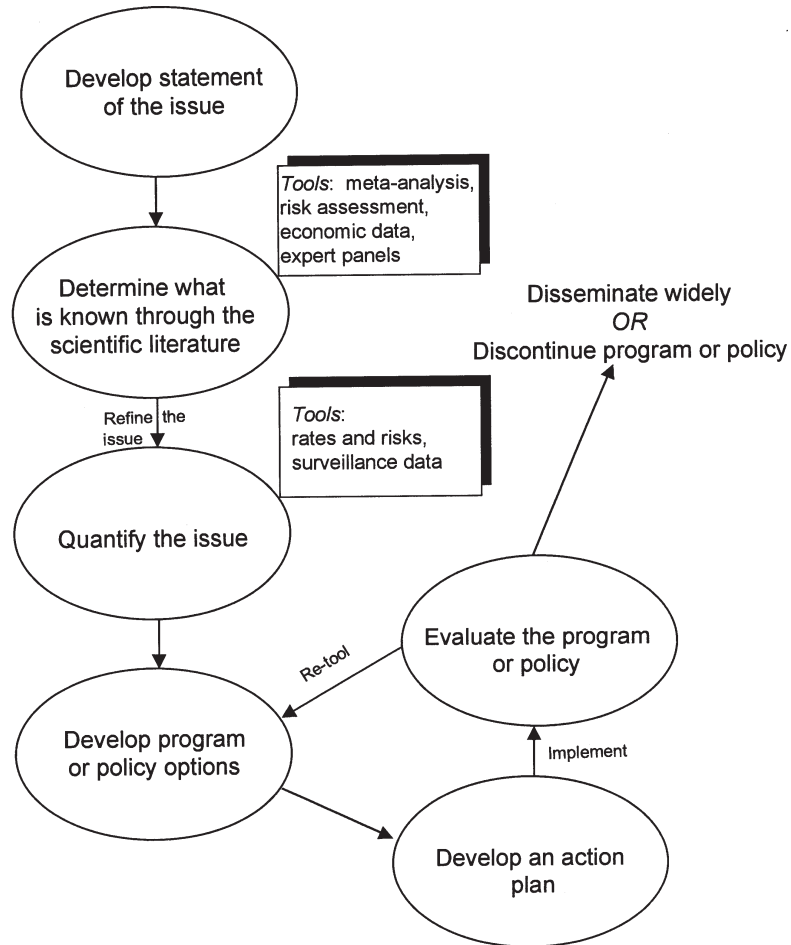
Resources in public health always are limited and development of new programs often is a zero-sum game. In addition, bodies of evidence for numerous public health interventions are growing continually, making choices increasingly complex. To rationally choose among alternatives and make the most prudent use of resources, stronger skills in EBPH are needed—these are a blend of art and science. Although work remains and testing of the proposed framework is ongoing, the authors hope the issues raised will stimulate debate on the strategies that will make EBPH a reality.

**Table 2**

Potential barriers and solutions for use of evidence-based decision making in public health

Barrier	Solution
Lack of leadership in setting a clear and focused agenda for EBPH	Commitment from all levels of public health leaders to increase the use of <i>effective</i> public health interventions
Lack of a view of the long-term “horizon” for program implementation and evaluation	Adoption and adherence to causal frameworks and formative evaluation plans
External pressures drive the process away from an evidence-based approach	Systematic communication and dissemination strategies
Inadequate training in key public health disciplines	Wider dissemination of new and established training programs, including use of distance learning technologies
Lack of time to gather information, analyze data, and review the literature for evidence	Enhanced skills for efficient analysis and review of the literature
Lack of comprehensive, up-to-date information on the effectiveness of programs and policies	Increased dissemination of guidelines in clinical and population-based strategies
Lack of data on the effectiveness of certain public health interventions or for special populations <sup>a</sup>	Increased funding for applied public health research

<sup>a</sup>Special populations are defined as groups that have not been widely studied for a particular health condition or intervention—e.g., certain racial/ethnic populations or women.



**Figure 1.** A sequential framework for enhancing evidence based public health

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