

# CHAPTER 1

## PUBLIC HEALTH PRACTICE AND THE BEST AVAILABLE EVIDENCE

**E**vidence-based public health practice uses the best available evidence to make informed decisions about programs, campaigns, initiatives, and policies to improve the health and well-being of countries, communities, and families. Effective public health practice systematically identifies gaps in health and health care and tracks down evidence-based programs to close those gaps. The evidence comes from a systematic study of completed and publicly available research on program effectiveness.

This chapter gives an overview of evidence-based public health practice and discusses the characteristics of high-quality research to evaluate program effectiveness. Subsequent chapters describe and explain how to practice evidence-based public health by (a) identifying community and population values and needs for health services through public contact and analysis of data, (b) tracking down available evidence-based programs to meet the needs, (c) analyzing the quality and strength of the evidence, and (d) evaluating and reporting on the results.

## ❖ CHAPTER OBJECTIVES

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After reading this chapter, you will be able to

- Describe evidence-based public health's defining characteristics, including how to evaluate community needs for services and use the best available evidence to meet those needs
- Explain the similarities and differences between evidence-based public health and evidence-based medicine
- List websites to go to for information on evidence-based public health
- Define effectiveness and evaluation research as a source of evidence, and distinguish it from other types of research in the health sciences
- Explain the link between evidence-based public health, evaluation research, epidemiology, and health services research
- Define commonly used evaluation research terms like *impact and outcome evaluations*, *qualitative and quantitative research*, *practical clinical trial*, *comparative effectiveness research*, and *cost-effectiveness evaluations*

## ❖ EVIDENCE-BASED PUBLIC HEALTH PRACTICE: DEFINITIONS, PURPOSES, AND METHODS

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**Public health** is “the science and art of preventing disease, prolonging life and promoting health through the organized efforts and informed choices of society, organizations, public and private, communities and individuals.” This definition comes from C.-E. A. Winslow (1920, p. 23), and even though he devised it the 1920s, it is still accurate. The highest quality public health practices are population-centered, equitable, proactive, health promoting, risk-reducing, vigilant, transparent, effective, and efficient (Honoré & Scott, 2010).

**Evidence-based public health** uses the best available evidence to make informed decisions in supporting programs, campaigns, practices, and policies to improve the health and well-being of countries, communities, and other populations of people who share health needs. The **best available evidence** comes from an objective and reproducible study of the quality of existing research results. It requires skills in systematically identifying, evaluating, and using research and other valid information sources. Honoré and Scott (2010) have identified evidence-based practice as one of six priorities areas for improving quality in public health.

Evidence-based practices tend to challenge firmly held beliefs. New evidence from the best available clinical and evaluation research sometimes invalidates previously accepted practices and replaces them with new ones that are safer as well as more accurate and effective. Stomach ulcers were once thought to be the result of stress or eating spicy foods. Generations of ulcer sufferers drank gallons of milk, avoided certain foods, and tried to stay calm. In 2005, two Australian physicians won a Nobel Prize for their work showing that most stomach ulcers and gastritis were caused by colonization with a bacterium called *Helicobacter pylori* and not by stress or spicy food. Now, stomach ulcer patients are usually treated with antibiotics (Marshall & Warren, 1984).

The public health literature is filled with examples of well-intentioned but unevaluated programs (e.g., injection of gold salts to treat tuberculosis, early incarnations of the D.A.R.E. substance abuse prevention program, hormone replacement therapy) that were continued, sometimes for decades, until rigorous and appropriate evaluations revealed that the results were not as intended (Vaughan, 2004). Another problem, perhaps the reverse of implementing ineffective interventions, is the failure to implement programs that actually have supporting evidence of effectiveness. Society pays a high opportunity cost when programs that yield the highest health return on an investment are not implemented. According to many practitioners, decisions are often based on perceived short-term opportunities, lacking systematic planning and review of the best evidence regarding effective approaches (Brownson, Fielding, & Maylahn, 2009).

## CHARACTERISTICS OF EVIDENCE-BASED PUBLIC HEALTH PRACTICE: COMMUNITY HEALTH AND SERVICE NEEDS, EVIDENCE, PROGRAMS, AND EVALUATION ❖

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Evidence-based public health practice is characterized by the accomplishments of five activities:

1. **Evaluating needs for new or improved programs or practices.** *Needs* are gaps in health status or services and include social, epidemiological, behavioral, and genetic factors. Social needs usually refer to a community's or population's perceptions of its problems (obesity in one community and gang violence in another). Epidemiological needs refer to problems that affect a large number of people (epidemics such as whooping cough, violence, or cholera). Behavioral needs refer to individual and

communal lifestyles and beliefs that affect well-being (views on what really constitutes a healthy diet), while physical needs refer to external social factors (access to fresh fruit and vegetables). Other needs may be environmental (for safer schools or better transportation to health clinics) and genetic (the identification of genes that cause or regulate susceptibility to diseases such as cancer).

Data for evaluating needs come from epidemiological databases and from reviews of existing databases such as those maintained by the Centers for Disease Control and Prevention (CDC) and other public health agencies. Additional sources of information about community needs come directly from interviewing and observing the affected population.

**2. Tracking down the best available evidence on programs and practices that potentially meet the needs.** This means identifying and reviewing online bibliographic databases such as PubMed to locate appropriate articles and studies. PubMed is a service of the National Library of Medicine. Some agencies, such as the Agency for Healthcare Research and Quality, maintain databases of evaluated programs. Evidence-based public health practice requires learning where to search for programs that are useful for the community.

**3. Collecting the best available information on appropriate programs and practices.** The best available information is accessible, valid, and useful. Information is accessible when it is recorded and reachable by the public. Determining validity requires skill in assessing the quality of a study's research design, measurement choices, statistical methodology, and findings. Appropriate programs are those for which the benefits in terms of improving public health outweigh the risks and hassles of implementation. Useful programs are those that solve community problems and meet their needs by reducing community members' health risks and improving their health and well-being. Evidence is imperfect, and practitioners should seek the best evidence available, not the best evidence possible (Brownson et al., 2009).

**4. Selecting programs that fit together with community and population needs and values.** A *community* is any population of people who are bound together by their risks, resources, and beliefs. People with the same chronic disease, pathological gamblers, and people who share an occupation may be said to belong to the same community. In some cases, a community is identified by its geographic location.

*Community values* are the community's or population's beliefs, preferences, concerns, and expectations. Evidence-based public health practice uses various methods to learn about values. These include living in the

community; surveying and meeting regularly with community members to find out about their values, beliefs, and preferences; and enlisting the community to participate directly in the research.

5. **Evaluating the impact on health and well-being of putting the selected programs into practice.** There are at least two purposes for doing the evaluation. The first is to find out whether the new or improved evidence-based program satisfies the community's needs. Did it improve the health-related behavior of providers, patients, and systems? Was care appropriate, with benefits outweighing risks? Without overuse of services? Without underuse of services? Were public health goals achieved? Public health goals include measures of general health status (such as healthy life expectancy, chronic disease prevalence), health-related quality of life and well-being, and health disparities. Public health goals can be found on the websites of the U.S. Department of Health and Human Services Healthy People series (<http://www.healthypeople.gov/2010> etc [www.healthypeople.gov/2020/about/tracking.aspx](http://www.healthypeople.gov/2020/about/tracking.aspx)) and the World Health Organization (<http://www.who.int/entity/en>).

A second purpose for doing the evaluation is to find out whether, and in what places, the program needs improvement. Did all segments of the community benefit equally? If not, do we need a special campaign to reach those who were left out? Did the program's effects continue after the experimental or transitional phase? If not, do we need to do a better job in training the staff to take over?

## EVIDENCE-BASED MEDICINE AND EVIDENCE-BASED PUBLIC HEALTH ❖

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Evidence-based public health practice relies on evaluation researchers to test and report on the effectiveness of new programs and initiatives. The historical basis for public health practice's dependence on evidence, and ultimately on evaluation research, is found in evidence-based medicine.

**Evidence-based medicine** came into health care consciousness back in the mid-1990s. Its most traditional definition is the "conscientious, explicit, and judicious use of current best evidence in making decisions about the care of individual patients" (Sackett, Straus, Richardson, Rosenberg, & Haynes, 2000, p. 1). Over time, the definition has been expanded and sometimes includes the use of current best evidence in making decisions about the health of communities.

Evaluating medical interventions for safety and effectiveness in an experimental way has probably existed for many hundreds of years. Among the first recorded evaluations is one that dates back to biblical times. Daniel of Judah

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compared the health effects of a vegetarian diet (the intervention) with those of the Royal Babylonian diet (control group) over a 10-day period. The Book of Daniel (1:15–16) records the findings:

At the end of the ten days their appearance was better and their bodies healthier than all the young men who had been eating the royal delicacies. So the warden removed their delicacies and the wine from their diet and gave them a diet of vegetables instead.

According to Sackett et al. (2000), five of the originators of evidence-based medicine and the authors of an extremely influential textbook about it, its roots lie in Chinese medicine. In the reign of the Emperor Qianlong (1711–1799), a method known as *kaozheng* (practicing evidential research) was apparently used in relation to Confucian medical texts. Sackett et al. also identify the ideas of evidence-based medicine with postrevolutionary Paris clinicians, at least one of whom rejected the pronouncements of authorities that vivisection was good for cholera.

It was only in the 20th century that evidence-based medicine really evolved to affect almost all fields of health care and policy. Professor Archie Cochrane (1972/1999), a Scottish epidemiologist, through his book *Effectiveness and Efficiency: Random Reflections on Health Services* and subsequent advocacy, was responsible for the increasing acceptance of the concepts behind evidence-based practice. The explicit methodologies used to determine “best evidence,” however, were largely established by the McMaster University research group led by David Sackett and Gordon Guyatt. The term *evidence-based medicine* first appeared in the medical literature in 1992 in a paper by the Evidence-Based Medicine Working Group.

So are evidence-based medicine and evidence-based public health practice the same? Not exactly. In evidence-based medicine, each physician’s clinical expertise is used as the basis of judgments for applying research findings to the care of *individual* patients. This means that when physicians (also nurses, social workers, psychologists, occupational therapists, and so on) are presented with research findings or data on groups of people (such as diabetic patients, substance abusers, or people injured at work), they must use their clinical expertise to translate the research into care for each individual patient with diabetes, substance abuse, or injury, respectively.

Evidence-based public health practice works outside of the direct clinical encounter. It focuses instead on analyzing research findings or data to make decisions for communities or populations of people.

There are important differences between the disciplines of public health and medicine, which are helpful in understanding the application of evidence-based approaches to practice, as illustrated in Table 1.1.

**Table 1.1** General Differences Between Public Health and Medicine

	<b>Public Health</b>	<b>Medicine</b>
Primary Focus	Populations and communities	Individuals
Emphasis	Prevention	Diagnosis and treatment
	Health promotion	Treatment
	Whole community	Whole patient
Paradigm	Interventions aimed at environment, human behavior and lifestyle, and medical care	Medical care, lifestyle
Organizational Lines of Specialization	Analytical (epidemiology)	Organ (cardiology, gastroenterology)
	Setting and population (occupational health, school health)	Patient group (pediatrics, geriatrics)
	Substantive health problems (nutrition, epidemics such as HIV)	Etiology, pathophysiology (oncology, infectious disease)
	Skills in assessment, policy development, and assurance	Technical skill (radiology)

SOURCE: Adapted from Fineberg, 2003; Reprinted with permission from the National Academies Press, Copyright 2003, National Academy of Sciences.

Another way of contrasting medicine and public health is to ask, Why do people die in the United States? Medically minded individuals usually respond by listing the major causes of death in terms of disease: heart disease; cancer; stroke (cerebrovascular disease); chronic lower respiratory diseases; accidents; Alzheimer’s disease; diabetes; influenza and pneumonia; nephritis, nephrotic syndrome, and nephrosis; septicemia (see CDC, 2011b). Public health people respond differently, listing risk factors. For example, they may point out that 19% of Americans die of tobacco-related illness, 14% from poor diet and lack of exercise, 5% from alcohol-related disease, and 2.5% from gun injuries (McGinnis & Foege, 1993). Public health is in the business of identifying risks, regardless of disease, and devising strategies to enable people and populations to avoid these risks. This role is often described as health promotion, that is, changing exposure to risks in the environment or modifying unhealthy behaviors (Bloom, n.d.).

How do the differences between medicine and public health affect evidence-based public health practice? The short answer is, not as much as you might

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think. Both are dependent upon identifying the highest quality—best—available evidence-based programs. Perhaps most important, evidence-based public health and evidence-based medicine both accept the fundamental idea that evidence replaces anecdote in making health care and health policy decisions. Here are two definitions of evidence-based public health:

1. Evidence-based public health is the conscientious, explicit and judicious use of current best evidence in making decisions about the care of communities and populations in the domain of health protection, disease prevention, health maintenance and improvement (Jenicek, 1997).
2. Evidence-based public health is the development, implementation, and evaluation of effective programs and policies and public health through application of principles of scientific reasoning including systematic uses of data and information systems and appropriate use of program planning models (Brownson, Gurney, & Land, 1999).

The first definition sounds very much like the definition of evidence-based medicine, with an emphasis on making decisions about communities and populations (rather than individual patients) based on current best evidence. The second definition calls for use of scientific reasoning and systematic use of data and information systems, key components of the methods for obtaining best evidence.

Kohatsu, Robinson, and Torner (2004) draw appropriate parallels between evidence-based public health and medicine because both are concerned with asking questions, collecting relevant evidence to answer those questions, and evaluating the effectiveness of the process and its outcomes. Evidence-based public health focuses on understanding and preventing disease and promoting health in communities. Evidence-based medicine tends to focus on diagnosis and treatment (although primary care or generalist medicine is also concerned with prevention) in individuals.

According to the American Public Health Association, evidence-based practice and policy explores the processes of systematically finding, appraising, and using scientific research as the basis for developing sound practices. The knowledge gleaned from this research is used to develop policies and practices that improve health outcomes and performance as well as allow for more efficient use of resources. Policy makers are also provided with a better understanding of the science, ensuring that policy decisions are based on the best information available.

Table 1.2 provides a list of websites that you can go to for more information about evidence-based public health.



**Table 1.2** Websites for More Information on Evidence-Based Public Health

Agency for Healthcare Research and Quality: <a href="http://www.ahrq.gov">www.ahrq.gov</a>
American Public Health Association: <a href="http://www.apha.org">www.apha.org</a>
Centers for Disease Control's Guide to Community Preventive Services: <a href="http://www.thecommunityguide.org">www.thecommunityguide.org</a>
Centre for Evidence-Based Medicine (Toronto): <a href="http://kclearinghouse.ca/cebm">http://kclearinghouse.ca/cebm</a>
The Cochrane Collaboration: <a href="http://www.cochrane.org">www.cochrane.org</a>
The Evidence Network (United Kingdom): <a href="http://www.kcl.ac.uk/schools/sspp/interdisciplinary/evidence">www.kcl.ac.uk/schools/sspp/interdisciplinary/evidence</a>
HealthLinks: Evidence-Based Practice (University of Washington): <a href="http://healthlinks.washington.edu/ebp">http://healthlinks.washington.edu/ebp</a>
Healthy People 2010 and 2020: <a href="http://www.healthypeople.gov/2020">www.healthypeople.gov/2020</a>
The Lamar Soutter Library, Evidence-Based Practice for Public Health (University of Massachusetts): <a href="http://library.umassmed.edu/ebpph/">http://library.umassmed.edu/ebpph/</a>
National Cancer Institute: <a href="http://www.cancer.gov">www.cancer.gov</a>
World Health Organization, Regional Office for Europe: Data and Evidence: <a href="http://www.euro.who.int/InformationSources/Evidence/20010827_1">www.euro.who.int/InformationSources/Evidence/20010827_1</a>

## CURRENT BEST AVAILABLE EVIDENCE FOR PUBLIC HEALTH PROGRAMS AND THE ROLE OF EVALUATION RESEARCH ❖

Evidence-based public health practice uses the best available evidence to make informed decisions about programs, campaigns, initiatives, and policies to improve the health and well-being of countries, communities, and families. A primary source of the evidence is evaluation research (also called program evaluation).

Evaluation research uses the scientific method to provide evidence of a program's effectiveness. As part of evidence gathering, evaluations collect data on the extent to which program participation influences outcomes, impact, and costs. Evaluations can also be used to study current program effectiveness and how to improve effectiveness in the future.

Example 1.1 provides two evaluation research summaries or abstracts.

### Example 1.1 Abstracts of Two Evaluation Studies

1. Munch and Move: Evaluation of a Preschool Healthy Eating and Movement Skill Program (Hardy, King, Kelly, Farrell, & Howlett, 2010)

**Background.** Early childhood services have been identified as a key setting for promoting healthy eating and physical activity as a means of preventing overweight and obesity. However, there is limited evidence on effective nutrition and physical activity programs in this setting. The purpose of this study was to evaluate *Munch and Move*, a low-intensity, state-wide, professional development program designed to support early childhood professionals to promote healthy eating and physical activity among children in their care.

**Methods.** The evaluation involved 15 intervention and 14 control preschools ( $N = 430$  [students]; mean age 4.4 years) in Sydney, New South Wales, Australia and was based on a randomised-control design with pre and post evaluation of children's lunchbox contents, fundamental movement skills (FMS), preschool policies and practices and staff attitudes, knowledge and confidence related to physical activity, healthy eating and recreational screen time.

**Results.** At follow up, FMS scores for locomotor, object control and total FMS score significantly improved by 3.4, 2.1 and 5.5 points more (respectively) in the intervention group compared with the control group ( $P < 0.001$ ) and the number of FMS sessions per week increased by 1.5 ( $P = 0.05$ ). The lunchbox audit showed that children in the intervention group significantly reduced sweetened drinks by 0.13 serves (i.e., 46 ml) ( $P = 0.05$ ).

**Conclusion.** The findings suggest that a low intensity preschool healthy weight intervention program can improve certain weight related behaviors. The findings also suggest that change to food policies are difficult to initiate mid-year and potentially a longer implementation period may be required to determine the efficacy of food policies to influence the contents of preschoolers lunchboxes.

2. Evaluation of REAL MEN (Freudenberg et al., 2010)

**Purpose.** This study assesses the impact of REAL MEN (Returning Educated African-American and Latino Men to Enriched Neighborhoods), an intervention designed to reduce drug use, risky sexual behavior and criminal activity among 16–18-year-old males leaving New York City jails.

**Methods.** Participants ( $N = 552$ ) were recruited in city jails and randomly assigned to receive an intensive 30-hour jail/community-based intervention or a single jail-based discharge planning session. All participants were also referred to optional services at a community-based organization (CBO). One year after release from jail, 397 (72%) participants completed a follow-up interview. Logistic and ordinary least squares regression was used to evaluate the impact of the intervention on drug use, risky sexual behavior, criminal justice involvement, and school/work involvement post release.

**Results.** Assignment to REAL MEN and, independently, use of CBO services significantly reduced the odds of substance dependence (odds ratio [OR] = .52,  $p \leq .05$ ; OR = .41,  $p \leq .05$ , respectively) 1 year after release. Those assigned to the intervention spent 29 fewer days in jail compared with the comparison group ( $p \leq .05$ ). Compared to non-CBO visitors, those who visited the CBO were more likely to have attended school or found work in the year after release (OR = 2.02,  $p \leq .01$ ).

**Conclusions.** Jail and community services reduced drug dependence 1 year after release and the number of days spent in jail after the index arrest. While these findings suggest that multifaceted interventions can improve outcomes for young men leaving jail, rates of drug use, risky sexual behavior, and recidivism remained high for all participants after release from jail, suggesting the need for additional policy and programmatic interventions.

The evaluation abstracts in Example 1.1 are typical evaluation reports. But are the studies valid? The only way to find out is to systematically analyze each study's quality. Looking at the abstracts, you can see that *doing* an evaluation requires skills in research design, statistics, data collection, and interpretation. Doing evidence-based public health requires skills in *reviewing* the evaluator's work, including the quality of the research design, statistical methods, data collection, and interpretation.

## EVALUATION AND EFFECTIVENESS ❖ RESEARCH: DEFINITIONS AND METHODOLOGICAL CONSIDERATIONS

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Evaluation is an essential part of public health; without evaluation's close ties to program implementation, we are left with the unsatisfactory circumstance of either wasting resources on ineffective programs or, perhaps worse, continuing public health practices that do more harm than good (Vaughan, 2004). Because of evidence-based public health's close ties to evaluation research, learning how to identify and only use the highest quality evaluation studies is essential.

The **program** or intervention is the focus of evaluation research. The term is a generic name for interventions, treatments, campaigns, and initiatives. A program consists of activities and resources that have been specifically selected to achieve beneficial outcomes. An example of a program is the 10-session school-based cognitive-behavioral intervention to reduce children's symptoms of PTSD resulting from exposure to violence. Other examples include an education campaign to promote a community's acceptance of the need for polio vaccinations or the 1-year intensive lifestyle intervention consisting of diet and physical activity.

According to the CDC (2011a), the term *program* is used to describe the object of evaluation, and it applies to any organized public health action. The CDC uses a broad definition so that the framework can be applied to almost any public health activity, including the following:

- direct service interventions
- community mobilization efforts
- research initiatives
- surveillance systems
- policy development activities
- outbreak investigations

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- laboratory diagnostics
- communication campaigns
- infrastructure building projects
- training and education services
- administrative systems

Scientific evaluation's premise is that objective confirmation of any program's effectiveness is essential before the program should go public. An effective program is one that is more likely to provide beneficial health outcomes than a comparable alternative program. These outcomes include reductions in health-related risks, improvements in health and well-being, and promotion of equal access to the highest quality of care.

A program's impact is its magnitude and duration. An evaluation researcher studying the cognitive-behavioral therapy intervention's impact on children with PTSD, for example, might assess the number of children (magnitude) who were beneficially affected (improvement in symptoms) and how long the benefits lasted (duration).

Evaluations that focus on a program's implementation and organization (rather than on its outcomes) are called various names, including *implementation* and *process evaluations* (Example 1.2). These evaluations are concerned with understanding the extent to which a program was delivered as originally planned, because variations in program implementation can influence outcomes.

### Example 1.2 Implementation Evaluation

We examined the integrity of the intervention as delivered by the clinicians, compared with the treatment manual by having an objective clinician rater listen to randomly selected audiotapes of sessions and assess both the extent of completion of the session material and the overall quality of therapy provided. Using a scale developed for this intervention, completion of required intervention elements, including at least cursory coverage of the topic, varied from 67% to 100% across sessions, with a mean completion rate of 96%. On 7 items assessing quality, quality of sessions was moderate to high across sessions.

Evaluations often result in voluminous amounts of data requiring careful management. Data management includes data entry and storage and setting up a system for ensuring confidentiality. Information to guide program development or evaluate its effectiveness is gathered and analyzed using **qualitative** or **quantitative** methods, or both. Qualitative methods involve

soliciting opinions and experiences and using logical induction. Quantitative methods rely on mathematical and statistical models. Example 1.3 illustrates the use of qualitative and quantitative methods

### Example 1.3 Qualitative and Quantitative Methods

1. Qualitative Methods (Excerpt) From Focus Groups: Mexican Americans With Type 2 Diabetes: Perspectives on Definitions, Motivators, and Programs of Physical Activity (Mier, Medina, & Ory, 2007)

Thirty-nine individuals attended a total of six focus groups. All participants received the same standardized question guide on definitions of physical activity, preferred types of physical activity, motivators and barriers to physical activity, and concepts of culturally sensitive interventions. . . . Each focus group lasted approximately 60 to 90 minutes, after which participants received a stipend and were personally thanked for their attendance. At the end of the group discussion, participants completed a written questionnaire on their demographic characteristics.

A team of Mexican American graduate students fluent in Spanish and English transcribed focus group discussions from audiotape. Five of the six transcriptions were written in Spanish to maintain the integrity of participants' responses. Only one focus group was conducted in English. . . .

Bilingual Mexican American members of the research team systematically reviewed and coded the transcripts and identified emerging themes. All team members had expertise in border studies related to Mexican Americans and a strong background in physical activity. . . . The research team identified, coded, and analyzed key words and emerging themes that indicated participants' issues and concerns. In cases of disagreement about key words or themes during the coding process, the team discussed the issue until reaching a consensus. If no consensus emerged, the principal investigator's decision prevailed.

2. Statistical Methods (Excerpt): Effects of Aerobic and Resistance Training on Hemoglobin A1c Levels in Patients With Type 2 Diabetes (Church et al., 2010)

All available data were examined using linear mixed-effects models for repeated measures over time. For the dependent variables, HbA<sub>1c</sub>, weekly step counts, and exercise training monthly data were available, whereas for the independent variables, assessing medications, fitness, strength, and anthropometry, only baseline and follow-up data were available. Covariates included baseline value, age, sex, duration of diabetes, and race/ethnicity, with the fitness variables also adjusted for maximum heart rate during exercise testing at baseline and follow-up. Results are presented as least-squares adjusted means with 95% confidence intervals (CIs).

Significance of between-group differences in medication changes (no change, increase, or decrease) were assessed using the  $\chi^2$  test with the linear association across groups assessed by the Mantel-Haenszel test. To assess concomitant reductions in hypoglycemic medication use and reductions in HbA<sub>1c</sub> levels, a composite dichotomous outcome variable was created. Individuals who decreased diabetes medication or reduced HbA<sub>1c</sub> by 0.5% without increasing medications were defined as successfully achieving the HbA<sub>1c</sub>-diabetes medication composite outcome. The likelihood of achieving the composite outcome was assessed using logistic regression with adjustment for baseline HbA<sub>1c</sub>, age, sex, duration of diabetes, and race/ethnicity.

In the first study in Example 1.3, the research team identified, coded, and analyzed key words and emerging themes that indicated participants' issues and concerns. In cases of disagreement about key words or themes during the coding process, the team discussed the issue until reaching a consensus. If no consensus emerged, the principal investigator's decision prevailed. In the second study, data are analyzed using statistical methods such as the  $\chi^2$  and logistic regression.

Evaluation research methods come from diverse disciplines, including health services research, epidemiology, and economics. Evaluations are almost always conducted in "real life" situations in which some eligible people may not participate in all of the program's activities, others may participate in competing activities, and still others may drop out. That is why evaluations are almost always referred to as **effectiveness** rather than **efficacy** studies, which are done under ideal conditions. Inability to control the environment and implement perfect research designs have led evaluation researchers to find ways of shoring up study validity by developing and improving upon existing research methods.

Evaluators have traditionally advocated including community members as part of the study team, sometimes inviting them early in the process to define the focus of the research and later on to help make certain the data being collected are valid and useful. Often, special techniques, such as community forums or interviews with key members of the community, are relied upon to make sure that evaluation considers high priority, culturally relevant concerns. More recently, the process of **participatory evaluation** or **community-based participatory research** has been extended by some evaluators to include stakeholders as partners in setting the evaluation agenda, doing all phases of the research, including analyzing and reporting on the results. Because evaluation almost always takes place within a political and organizational context, it requires group skills, management ability, political dexterity, and sensitivity to multiple decision makers.

An important development in evaluation is the increasing use of practical or pragmatic clinical trials (Tunis, Stryer, & Clancy, 2003). A practical clinical trial is specifically designed to answer questions faced by patients, health care providers, and policy makers as compared to researchers. Practical trials compare two or more interventions that are directly relevant to health care and assess their effectiveness in real-world practice. They use broad eligibility criteria and recruit participants from a variety of settings to ensure the inclusion of people whose health will actually be influenced by the study's results.



A form of practical clinical trial is **comparative effectiveness research (CER)**, which has become an integral part of U.S. health care research (Iglehart, 2009). CER is the generation and synthesis of evidence that compares the benefits and harms of alternative methods to prevent, diagnose,

treat and monitor a clinical condition, or to improve the delivery of care (Sox & Greenfield, 2009). The purpose of CER is to assist consumers, clinicians, purchasers, and policy makers to make informed decisions that will improve health care at both the individual and population levels. Two key elements that are embedded in this definition are the direct comparison of effective interventions and their study in patients who are typical of day-to-day clinical care. These features would ensure that the research would provide information that decision makers need to know.

## PROGRAM COSTS AND PROGRAM EFFECTIVENESS ❖

Evaluation research is increasingly being called upon to provide data on the costs of new programs in order to assist in making decisions between competing options. Suppose two programs are equally effective? An economic evaluation can tell which of the two will cost less. Table 1.3 defines four of the

**Table 1.3** Four Methods of Comparing Outcomes and Costs

1. **Cost-Effectiveness Analysis:** Programs are cost-effective when they save costs and offer equal or better outcomes than the alternative. A program is cost-effective when no other program is as effective at a lower cost.
  -  **CAUTION:** A program does not have to achieve all of its outcomes to be cost-effective, but it must cost less than its competition. Programs are also cost-effective when they save costs and offer equal or better outcomes than the alternative.
2. **Cost-Benefit Analysis:** Programs have value when their benefits (expressed in monetary terms) are equal to or exceed their costs.
  -  **CAUTION:** It is often difficult to express program benefits in monetary terms. For example, how does one go about placing a financial value on years of life saved, reductions in family violence, prevention of drug and alcohol abuse, or other similar planned social program outcomes?
3. **Cost Minimization Analysis:** This is a type of cost-effectiveness analysis in which Programs A and B have identical outcomes and the goal is to determine which one has the lower costs.
4. **Cost Utility Analysis:** This is a type of cost-effectiveness analysis in which the outcomes of Programs A and B are weighted by their value or quality and measured by a common metric such as quality of life years (QALYs), a measure that encompasses both the quantity or duration of life and its quality. For instance, an operation may gain a patient 10 years of life but result in physical impairment. A QALY measure takes into account the number of years of life saved (say, 10) in conjunction with the quality of the saved years (a value judgment). The goal of the analysis using a metric such as QALY is to determine which program produces the most quality-adjusted life years at lower cost.

major methods used in analyzing the comparative outcomes and costs of programs (Drummond, Richardson, O'Brien, Levine, & Heyland, 1997).

Program funders have been increasing their demands for economic evaluations of public health programs. Their justification is based on the realization that resources for programs are scarce, the resources have alternative uses, people have different needs, and there are never enough resources to satisfy everyone's needs.

The application of cost-effectiveness measures to meet one group's needs over another's has ethical implications. For instance, the elderly, the mentally ill, the homeless, children with special needs, and others may be excluded from access to certain programs because they are not expected to benefit a great deal from them, a particular problem when the programs are expensive. Moreover, people with special needs have traditionally been excluded from research because they are not "interesting" enough, do not yield reliable data (because they have multiple complex problems), or are not able to participate in research. As a result, the available data may be insufficient to measure the effectiveness, let alone the cost-effectiveness, of any given program for these groups. Critics of the use of economic evaluation also point out that what is "effective" sometimes differs between clinicians and researchers. If so, then what is "cost-effective" will also differ.

## ❖ EVALUATION RESEARCHERS AND OTHER EVALUATORS AND RESEARCHERS

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Evaluation research is usually included as a subdivision of the much larger field of evaluation, which has been described by the American Evaluation Association ([www.eval.org](http://www.eval.org)) as a profession composed of persons with varying interests, potentially encompassing but not limited to the evaluation of programs, products, personnel, policy, performance, proposals, technology, research, theory, and even evaluation itself. Evaluation research shares some of the purposes that are delineated by the American Evaluation Association in connection with other forms of program evaluation. These include contributing to informed decision making and more enlightened change, precipitating needed change, and empowering all stakeholders by collecting data from them and engaging them in the evaluation process.

The similarity between evaluation researchers and other program evaluators usually ends with the choice of method they use to achieve their aims. Some evaluators based their methods on disciplines as diverse as organizational theory, political action, or social networking, and these usually do not apply to effectiveness research. Evaluation researchers do scientific studies to



determine the effectiveness of programs. Their methods are often indistinguishable from and shared with other health and social scientists.

When evaluators do **research**, they are participating in systematic processes of inquiry aimed at discovering, interpreting, and revising information about programs (Fink, 2005). Evaluation research uses the **scientific method**, which is a set of techniques for investigating phenomena and acquiring new knowledge of the natural and social worlds, based on observable, measurable evidence.

The scientific method is also characterized by the belief that a study's activities must be objective so that the scientist cannot bias the interpretation of the results or change the results outright. Another basic expectation is that the researcher will make available complete documentation of the data and the methodology for careful scrutiny by other scientists and researchers, thereby allowing them the opportunity to duplicate and verify the results. Enabling this replication of results is a scientific and ethical imperative.

In fact, the field of **ethics**, also called moral philosophy, is directly associated with scientific research. Ethics involves systematizing, defending, and recommending concepts of right and wrong behavior. Because evaluations always include human participants, the evaluator must demonstrate that the study design attends to ethical principles and respects participants' privacy, ensures that the benefits of participation are maximized, and provides all participants with equal access to the benefits. The criteria for including and excluding participants must be justified, and there must be a sufficient number of participants so that a program has a chance to prove itself. Also, the data collection and analysis must be appropriate and valid. Research that is not sound is unethical in itself because it results in misleading or false conclusions that, when applied, may result in harm.

Reading and reviewing evaluation research requires expertise in research design and statistics. Evidence-based public health practice is characterized by teams of people who work together because their skills and expertise complement one another's.

Evaluation researchers rely on the scientific method, a characteristic they share with all social researchers who strive for the "truth." The main difference is that evaluation researchers specifically study the effects of programs, interventions, campaigns, initiatives, interventions, and policies on participants.

Other scientists, such as epidemiologists, study patterns of health and illness in the population. Health services researchers examine how people get access to health care, how much care costs, and what happens to patients as a result of this care. The main goals of health services research are to identify

the most effective ways to organize, manage, finance, and deliver high-quality care; reduce medical errors; and improve patient safety.

Evaluation, epidemiology, and health services research sometimes shares purposes or methods. If a program or intervention is involved, then the study is an evaluation. Example 1.4 contrasts evaluations and other types of research.

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**Example 1.4 Evaluation Research: Yes? No?**

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- A. Research Objective: To investigate the effectiveness of acupuncture compared with sham acupuncture and with no acupuncture in patients with migraine.

Is this objective likely to be consistent with evaluation research purposes?

Answer: Yes. The researchers compare three interventions: acupuncture, sham acupuncture, and no acupuncture. (No acupuncture is considered an intervention in this case because the absence of acupuncture does not mean the absence of anything at all. The no acupuncture group may be on medication or other forms of therapy.)

- B. Research Objective: To determine the effectiveness of an abuse-prevention curriculum designed to empower women with mental retardation to become effective decision makers.

Is this objective likely to be consistent with evaluation research purposes?

Answer: Yes. The intervention in this study is an abuse-prevention curriculum.

- C. Research Objective: To estimate 1-year prevalence and correlates of alcohol abuse, dependence, and subthreshold dependence (diagnostic orphans) among middle-aged and elderly persons in the United States.

Is this objective likely to be consistent with evaluation research purposes?

Answer: No. The researchers are not planning to analyze the implementation, outcomes, impact, or costs of a program or intervention. This is an epidemiological study of alcohol misuse among older U.S. adults.

- D. Research Objective: To clarify the concepts of coping with pain and quality of life (QoL) and to present a literature review of the strategies that children with recurrent headaches use to cope with their pain, the impact of recurrent headaches on children's QoL, and the influence of personal characteristics (such as age, family support) on headache, coping, and QoL in children.

Is this objective likely to be consistent with evaluation research purposes?

Answer: No. The researchers are not planning to analyze the process, outcomes, impact, or costs of a program or intervention.

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The difference between evaluations and other studies covering relevant public health topics is presented in Example 1.5.

**Example 1.5 Two Studies, One of Which (Study 1) Is an Evaluation**

1. What Are D.A.R.E.'S Effects on Alcohol, Tobacco, and Marijuana Use? (Vincus, Ringwalt, Harris, & Shamblen, 2010)

We present the short-term results of a quasi-experimental evaluation of the revised D.A.R.E. (Drug Abuse Resistance Education) curriculum. Study outcomes examined were D.A.R.E.'s effects on three substances, namely students' lifetime and 30-day use of tobacco, alcohol, and marijuana, as well as their school attendance and academic performance. The study comprised students in 17 urban schools, each of which served as its own control; 5th graders in the 2006–2007 school year constituted the comparison group ( $n = 1,490$ ), and those enrolled as 5th graders in the 2007–2008 school year constituted the intervention group ( $n = 1,450$ ). We found no intervention effect on students' substance use for any of the substance use outcomes assessed. We did find that students were more likely to attend school on days they received D.A.R.E. lessons and that students in the intervention group were more likely to have been suspended. Study findings provide little support for the implementation and dissemination of the revised D.A.R.E. curriculum.

2. Does Community Violence Exposure Predict Trauma Symptoms in a Sample of Maltreated Youth in Foster Care? (Garrido, Culhane, Raviv, & Taussig, 2010)

Previous studies find that childhood exposure to family and community violence is associated with trauma symptoms. Few studies, however, have explored whether community violence exposure (CVE) predicts trauma symptoms after controlling for the effects associated with family violence exposure (FVE). In the current study, CVE and FVE were examined in a sample of 179 youth with a recent history of maltreatment. CVE was associated with trauma symptoms after controlling for FVE, but FVE was not associated with trauma symptoms after controlling for CVE. In addition, negative coping strategies (e.g., self-harm, interpersonal aggression) partially mediated the association between CVE and trauma symptoms. These findings are discussed in terms of their implications for interventions aimed at addressing the needs of children exposed to violence.

Study 1 in Example 1.5 is an evaluation of the D.A.R.E. program's effectiveness in reducing exposure to alcohol, tobacco, and marijuana. Study 2 is concerned with finding out whether exposure to community violence predicts trauma symptoms in youth in foster care. No program is included in this study, and so it is not an evaluation.

Table 1.4 shows the relationship among evaluation research and evidence-based public health practice.

Many programs go unevaluated or are poorly done. The need for scientific evaluations is worldwide and encompasses programs from local initiatives to global health programs. In 2010, *The Lancet*, a world-renowned journal, published a UNICEF-commissioned evaluation of its Accelerated Child Survival and Development Program ("Evaluation: The Top Priority for Global Health," 2010). The results of the evaluation did not

**Table 1.4** Evaluation Research and Evidence-Based Public Health: Compare and Contrast

	<b>Evaluation Research</b>	<b>Evidence-Based Public Health Practice</b>
Objective	Produces valid evidence about the effectiveness of programs and practices Effective programs promote well-being and access to high-quality health care among communities and defined populations	Identifies, reviews, evaluates, and summarizes existing evidence regarding needs and effective programs and practices
Methods	Uses scientific method to design studies, collect information, and analyze and interpret data about the process, outcomes, impact, and costs of programs	Uses prespecified and transparent systems for grading the quality of the research and rating the strength of the evidence Uses the best evidence available to select programs and policies within the context of community needs and values
Ethical Concerns	Respects participants' rights to privacy and ensures they have an understanding of the risks and benefits of participation	Uses only research data that come from ethical research (e.g., evidence of an ethics board review)

match with the extravagant claims UNICEF had made about the program in 2005. The editorial stated,

Evaluation must now become the top priority in global health. Currently, it is only an afterthought. A massive scale-up in global health investments during the past decade has not been matched by an equal commitment to evaluation. This complacency is damaging the entire global health movement. Without proper monitoring and accountability, countries and donors—and taxpayers—have no idea whether or how their investments are working. A lack of knowledge about whether aid works undermines everybody's confidence in global health initiatives. . . . Research will not only sustain interest in global health. It will improve quality of decision making, enhance efficiency, and build capacity for understanding why some programmes work, while others do not. . . . Evaluation matters. Evaluation is science. And evaluation costs money. (p. 526)

Table 1.5 contains a list of evaluation reports and articles that will give you an introduction to the contents, methods, and format of typical evaluation studies.

**Table 1.5** Sample Evaluation Reports and Articles

- Belansky, E. S., Cutforth, N., Delong, E., Litt, J., Gilbert, L., Scarbro, S., et al. (2010). Early effects of the federally mandated local wellness policy on school nutrition environments appear modest in Colorado's rural, low-income elementary schools. *Journal of the American Dietetic Association, 110*, 1712–1717.
- Belsky, J., Melhuish, E., Barnes, J., Leyland, A. H., & Romaniuk, H. (2006). Effects of Sure Start local programmes on children and families: Early findings from a quasi-experimental, cross-sectional study. *British Medical Journal, 332*, 1476–1478.
- Chien, A. T., Li, Z., & Rosenthal, M. B. (2010). Improving Timely childhood immunizations through pay for performance in Medicaid-managed care. *Health Services Research, 45*(6p2), 1934–1947.
- Ciaranello, A. L., Molitor, F., Leamon, M., Kuenneth, C., Tancredi, D., Diamant, A. L., et al. (2006). Providing health care services to the formerly homeless: A quasi-experimental evaluation. *Journal of Health Care for the Poor and Underserved, 17*, 441–461.
- Diamant, A. L., Brook, R. H., Fink, A., & Gelberg, L. (2001). Assessing use of primary health care services by very low-income adults in a managed care program. *Archives of Internal Medicine, 161*, 1222–1227.
- Fink, A., Elliott, M. N., Tsai, M., & Beck, J. C. (2005). An evaluation of an intervention to assist primary care physicians in screening and educating older patients who use alcohol. *Journal of the American Geriatrics Society, 53*, 1937–1943.
- Fishbein, M., Hall-Jamieson, K., Zimmer, E., von Haeften, I., & Nabi, R. (2002). Avoiding the boomerang: Testing the relative effectiveness of antidrug public service announcements before a national campaign. *American Journal of Public Health, 92*, 238–245.
- Fox, P. G., Rossetti, J., Burns, K. R., & Popovich, J. (2005). Southeast Asian refugee children: A school-based mental health intervention. *International Journal of Psychiatric Nursing Research, 11*, 1227–1236.
- Freudenberg, N., Ramaswamy, M., Daniels, J., Crum, M., Ompad, D. C., & Vlahov, D. (2010). Reducing drug use, Human Immunodeficiency Virus Risk, and recidivism among young men leaving jail: Evaluation of the REAL MEN re-entry program. *Journal of Adolescent Health, 47*, 448–455.
- Goodpaster, B. H., DeLany, J. P., Otto, A. D., Kuller, L., Vockley, J., South-Paul, J. E., et al. (2010). Effects of diet and physical activity interventions on weight loss and cardiometabolic risk factors in severely obese adults. *JAMA: The Journal of the American Medical Association, 304*(16), 1795–1802.
- Hardy, L., King, L., Kelly, B., Farrell, L., & Howlett, S. (2010). Munch and Move: Evaluation of a preschool healthy eating and movement skill program. *International Journal of Behavioral Nutrition and Physical Activity, 7*(1), 80.
- Hay, J., LaBree, L., Luo, R., Clark, F., Carlson, M., Mandel, D., et al. (2002). Cost-effectiveness of preventive occupational therapy for independent-living older adults. *Journal of the American Geriatric Society, 50*, 1381–1388.

(Continued)

**Table 1.5** (Continued)

Hedman, E., Andersson, G., Andersson, E., Ljotsson, B., Ruck, C., Asmundson, G. J. G., et al. (2011). Internet-based cognitive-behavioural therapy for severe health anxiety: Randomised controlled trial. *British Journal of Psychiatry*, *198*, 230–236.

Klesges, R. C., Obarzanek, E., Kumanyika, S., Murray, D. M., Klesges, L. M., Relyea, G. E., et al. (2010). The Memphis Girls' health Enrichment Multi-site Studies (GEMS): An evaluation of the efficacy of a 2-year obesity prevention program in African American girls. *Archives of Pediatrics and Adolescent Medicine*, *164*, 1007–1014.

Lobera, I. J., Lozano, P. L., Ríos, P. B., Candau, J. R., Del Villar y Lebreros, G. S., Milan, M. T. M., et al. (2010). Traditional and new strategies in the primary prevention of eating disorders: A comparative study in Spanish adolescents. *International Journal of General Medicine*, *3*, 263–272.

Lovera, D., Sanderson, M., Bogle, M. L., & Vela Acosta, M. S. (2010). Evaluation of a breastfeeding peer support program for fathers of Hispanic participants in a Texas special supplemental nutrition program for women, infants, and children. *Journal of the American Dietetic Association*, *110*, 1696–1702.

Petry, N. M., Weinstock, J., Morasco, B. J., & Ledgerwood, D. M. (2009). Brief motivational interventions for college student problem gamblers. *Addiction*, *104*, 1569–1578.

Polaschek, D. L. L., Wilson, N. J., Townsend, M. R., & Daly, L. R. (2005). Cognitive-behavioral rehabilitation for high-risk violent offenders: An outcome evaluation of the violence prevention unit. *Journal of Interpersonal Violence*, *20*, 1611–1627.

Runyan, C. W., Gunther-Mohr, C., Orton, S., Umble, K., Martin, S. L., & Coyne-Beasley, T. (2005). Prevent: A program of the National Training Initiative on Injury and Violence Prevention. *American Journal of Preventative Medicine*, *29*(5S2), 252–258.

Rydholm, L., & Kirkhorn, S. R. (2005). A study of the impact and efficacy of health fairs for farmers. *Journal of Agricultural Safety and Health*, *11*, 441–448.

Sheeran, P., & Silverman, M. (2003). Evaluation of three interventions to promote workplace health and safety: Evidence for the utility of implementation intentions. *Social Science and Medicine*, *56*, 2153–2163.

Stein, B. A., Jacox, L. H., Kataoka, S. H., Wong, M., Tu, W., Elliott, M. N., et al. (2003). Mental health intervention for school children exposed to violence: A randomized controlled trial. *Journal of the American Medical Association*, *290*, 603–611.

Wells, K. B., Sherbourne, C., Schoenbaum, M., Duan, N., Meredith, L., Unutzer, J., et al. (2000). Impact of disseminating quality improvement programs for depression in managed primary care: A randomized controlled trial. *Journal of the American Medical Association*, *268*, 212–220.

Wheeler, M. T., Heidenreich, P. A., Froelicher, V. F., Hlatky, M. A., & Ashley, E. A. (2010). Cost-effectiveness of preparticipation screening for prevention of sudden cardiac death in young athletes. *Annals of Internal Medicine*, *152*, 276–286.

In addition to evaluation research, evidence-based public health practice uses research from many fields, including epidemiology and health services research, for data on needs, methods, and best practices (Brownson et al., 2009). For example, suppose a health district was interested in improving childhood immunizations. A study in the journal *Health Services Research* reveals the impact of a “piece-rate” pay-for-performance program (Example 1.6).

**Example 1.6 Improving Timely Childhood Immunizations Through Pay for Performance in Medicaid-Managed Care (Chien, Li, & Rosenthal, 2010)**

**Objective.** To evaluate the impact of a “piece-rate” pay-for-performance (P4P) program aimed at rewarding up-to-date immunization delivery to 2-year-olds according to the recommended series.

**Data Sources/Study Setting.** Plan-level data from New York State’s Quality Assurance Reporting Requirement and claims data from Hudson Health Plan for 2003–2007. In 2003 Hudson Health Plan, a not-for-profit Medicaid-focused managed care plan, introduced a U.S.\$200 bonus payment for each fully immunized 2-year-old and provided administrative supports for identifying children who may need immunization. This represented a potential bonus of 15–25 percent above base reimbursement for eligible 2-year-olds.

**Study Design.** Case-comparison and interrupted times series.

**Principal Findings.** Immunization rates within Hudson Health Plan rose at a significantly, albeit modestly, higher rate than the robust secular trend noted among comparison health plans. Supplementary analyses suggest that there was no significant change in preexisting disparities during the study period, and that children with chronic conditions have significantly greater odds of being fully immunized during the entire study period.

**Conclusions.** This study suggests that a piece-rate P4P program with appropriate administrative supports can be effective at improving childhood immunization rates.

**SUMMARY OF CHAPTER 1: PUBLIC HEALTH PRACTICE AND THE BEST AVAILABLE EVIDENCE**

Words to Remember

abstracts, best available evidence, clinical trials, community-based participatory research, cost-benefit, cost-effective, cost minimization, cost utility, effectiveness, efficacy, ethics, evaluation research, evidence-based public health practice, experimental group, experimental studies,

health services research, Healthy People, impact, implementation evaluation, needs, observational research, outcomes, participatory evaluation, process, program, public health, qualitative, quantitative, research, research ethics, scientific method, study quality

Evidence-based public health practice is characterized by its use of the best available evidence to make informed public health practice decisions. It is a means of identifying community needs, tracking down information from evaluation research to find potentially effective programs, assessing the quality of the research or evidence supporting the programs, and evaluating the impact of introducing the programs into practice. Evaluation research is a systematic method of assessing the process, outcomes, impact, and costs of a program or intervention. Scientific evaluations aim to produce valid research evidence about the effectiveness of programs and practices.

Evidence-based public health uses evidence from evaluation research to guide decision making about programs. Evaluators do the research. Evidence-based public health practitioners review the research requiring them to have skills in evaluating study quality. In addition to evaluation research, practitioners use data and methods from health services research and epidemiology.

## THE NEXT CHAPTER

**Chapter 2** discusses how to analyze community needs and preferences for services and identify high-quality programs and services to meet them.

## EXERCISES

1. List five defining characteristics of evidence-based public health.

Answer:

- Evaluating needs for new or improved programs or practices
- Tracking down the best available evidence on programs and practices that potentially meet the needs
- Collecting the best available information on appropriate programs and practices
- Selecting programs and practices that fit together with community and population needs and values
- Evaluating the impact on health and well-being of putting the selected programs into practice

2. Define evidence-based public health practice.

Answer:

Evidence-based public health practice uses the best available evidence to promote the health and well-being of communities and populations.



3. Explain the similarities and differences between evidence-based public health practice and evidence-based medicine.

Answer:

Evidence-based public health and evidence-based medicine are both concerned with asking answerable questions, collecting relevant evidence to answer the questions, and evaluating the effectiveness of the process. Evidence-based public health practice focuses on understanding and preventing disease and promoting health in communities. Evidence-based medicine tends to focus on diagnosis and treatment in individuals. Both require skills in identifying and evaluating existing knowledge from research.

4. Describe methods for obtaining best available evidence.

Answer:

Systematic review of the literature, especially evaluation research findings or comparative effectiveness studies.

5. Explain and justify the use of evidence-based public health practice.

Answer:

Evidence-based public health practice replaces anecdote with the findings of the best research that is publicly available. It provides reasonable confirmation that a program or practice will improve public health.

6. How does evidence-based public health practice use evaluation research or program evaluation findings?

Answer:

Evidence-based public health practice uses evaluation findings in guiding decisions regarding which programs to support.

7. Explain whether each of these is an evaluation study or not.

- a. **Research Objective:** To evaluate a randomized culturally tailored intervention to prevent high-HIV-risk sexual behaviors for Latina women residing in urban areas.
- b. **Research Objective:** To determine the efficacy of a spit tobacco (ST) intervention designed to promote ST cessation and discourage ST initiation among male high school baseball athletes.
- c. **Research Objective:** To study drivers' exposure to distractions, unobtrusive video camera units were installed in the vehicles of 70 volunteer drivers over 1-week time periods.

Answer:

- a. Yes. This is an evaluation study. The program is an intervention to prevent high-HIV-risk sexual behaviors for Latina women in urban areas.
- b. Yes. This is an evaluation study. The intervention is a spit tobacco intervention.
- c. No. This is not an evaluation study. The researchers are not analyzing the process, outcomes, impact, or costs of a program or intervention.

26 ● EVIDENCE-BASED PUBLIC HEALTH PRACTICE

8. Define the major characteristics of evaluation research.

Answer:

- Produces valid evidence about effectiveness of programs and interventions by studying their process, outcomes, impact, and costs
- Uses scientific method to design studies, collect information, and analyze and interpret data
- May add a participatory dimension to ensure that evidence obtained is evidence that matters (meets needs, values, and expectations of stakeholders)
- Respects participants' rights to privacy and ensures that they have an understanding of the risks and benefits of participation

9. Read the following five statements and tell whether you agree or disagree with each or do not have sufficient information to agree or disagree.

Statement	Agree	Disagree	Cannot Tell (Not Enough Information)
1. If a report provides detailed descriptive statistical information about a program (e.g., number of people who participated in the program, how many of them benefited, duration of the program), that is proof that the program is effective.			
2. To qualify as an effective program, you need at least one of these: data on how program participants' outcomes compare to nonparticipants'; comparable outcome data from established databases; long-term data on outcomes for one or more groups of people.			
3. Once you find an effective program, it doesn't matter if you change parts of it to meet your needs as long as you stay true to the program developer's intentions.			
4. Effective programs are usually less costly than ones that are of unproven effectiveness.			

Statement	Agree	Disagree	Cannot Tell (Not Enough Information)
5. Evaluation reports do not need to include information on program activities such as staff training and monitoring of quality and adherence to the study's implementation because such information is not needed to arrive at a conclusion about a program's effectiveness.			

10. Compare these four definitions of evaluation.

- Evaluation research is a systematic method of assessing the process, outcomes, impact, and costs of a program or intervention. Scientific evaluations produce the best research evidence about the effectiveness of programs and new knowledge about social behavior. For research evidence to matter, it must be accurate and helpful to the evaluation's users.
- The key to a successful program or project is evaluation. Evaluation provides formative feedback that helps guide a program as it is being implemented. It also provides summative data that clearly demonstrate that the program is accomplishing its stated goals and objectives. Without effective evaluation, the program staff may fail to document important impacts the program has on its participants. It may also fail to recognize how different components in the program are affecting the participants or participating institutions. In an era of limited resources for educational programs, those programs that can document their success in having an impact on their participants and in using resources efficiently will be at an advantage for ongoing funding.
- The purpose of evaluation is to produce information about the performance of a program in achieving its objectives. In general, most evaluations are conducted to answer two fundamental questions: Is the program working as intended, and why is this the case? Research methods are applied to answer these questions and to increase the accuracy and objectivity of judgments about the program's success in reaching its objectives.
- The generic goal of most evaluations is to provide "useful feedback" to a variety of audiences, including sponsors, donors, client-groups, administrators, staff, and other relevant constituencies. Most often, feedback is perceived as "useful" if it aids in decision making. But the relationship between an evaluation and its impact is not a simple one—studies that seem critical sometimes fail to influence short-term decisions, and studies that initially seem to have no influence can have a delayed impact when more congenial conditions arise. Despite this, there is broad consensus that the major goal of evaluation should be to influence decision making or policy formulation through the provision of empirically driven feedback.

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11. Name up to five sites where you can get more information on evidence-based public health.

Answer:

Agency for Healthcare Research and Quality: [www.ahrq.gov](http://www.ahrq.gov)

American Public Health Association: [www.apha.org](http://www.apha.org)

Centers for Disease Control's Guide to Community Preventive Services: [www.thecommunityguide.org](http://www.thecommunityguide.org)

Centre for Evidence-Based Medicine (Toronto): <http://ktclearinghouse.ca/cebm>

**The Cochrane Collaboration:** [www.cochrane.org](http://www.cochrane.org)

**World Health Organization, Regional Office for Europe: Data and Evidence:** [www.euro.who.int/InformationSources/Evidence/20010827\\_1](http://www.euro.who.int/InformationSources/Evidence/20010827_1)

12. Which type of economic evaluation was probably performed?

An Economic Analysis of Programs to Care for Mentally Ill Patients (Tsai, Chen, & Yin, 2005)

Evaluators interviewed 40 mentally ill patients who were given hospital-based home care and 40 who received conventional outpatient follow-up. The interviews covered topics like disease maintenance behavior, psychotic symptoms, social function, service satisfaction, and cost. The cost for each patient was the sum of costs for all direct mental health services. The evaluators found that the costs of the hospital-based home care model were lower than those of conventional outpatient follow-up and that, over a one-year period, hospital-based home care was associated with improvements in mental health, social outcomes, and satisfaction with services. Policy makers may consider the improved outcomes and the lower costs in the hospital-based home care program revealed in this analysis as they allocate resources and develop policy for the care of mentally ill patients.

Answer:

The investigators conducted a cost-effectiveness evaluation in which they found that hospital-based home care improved care at lower cost than conventional outpatient services.

13. Select three evaluation reports from Table 1.3.
- Describe the programs that are being tested and compared.
  - Discuss the public health implications of the findings.

## REFERENCES

- Bloom, B. R. (with Brown, P). (n.d.). *The future of public health*. Retrieved from [http://www.hsph.harvard.edu/foph/foph\\_web.html](http://www.hsph.harvard.edu/foph/foph_web.html)
- Brownson, R. C., Fielding, J. E., & Maylahn, C. M. (2009). Evidence-based public health: A fundamental concept for public health practice. *Annual Review of Public Health, 30*, 175–201.

- Brownson, R. C., Gurney, J. G., & Land, G. H. (1999). Evidence-based decision making in public health. *Journal of Public Health Management and Practice*, 5(5), 86–97.
- Centers for Disease Control and Prevention. (2011a). *A framework for program evaluation*. Retrieved from <http://www.cdc.gov/eval/framework/index.htm>
- Centers for Disease Control and Prevention. (2011b). *Leading causes of death*. Retrieved from <http://www.cdc.gov/nchs/fastats/lcod.htm>
- Chien, A. T., Li, Z., & Rosenthal, M. B. (2010). Improving timely childhood immunizations through pay for performance in Medicaid-managed care. *Health Services Research*, 45, 1934–1947.
- Church, T. S., Blair, S. N., Cocroham, S., Johannsen, N., Johnson, W., Kramer, K., et al. (2010). Effects of aerobic and resistance training on hemoglobin A1c levels in patients with type 2 diabetes. *Journal of the American Medical Association*, 304, 2253–2262.
- Cochrane, A. L. (1972). *Effectiveness and efficiency: Random reflections on health services*. London, UK: Royal Society of Medicine Press. (Original work published 1972)
- Drummond, M. F., Richardson, W. S., O'Brien, B. J., Levine, M., & Heyland, D. (1997). Users' guides to the medical literature. XIII. How to use an article on economic analysis of clinical practice. A. Are the results of the study valid? Evidence-Based Medicine Working Group. *Journal of the American Medical Association*, 277, 1552–1557.
- Evaluation: The top priority for global health. (2010). *Lancet*, 375, 526.
- Evidence-Based Medicine Working Group. (1992). Evidence-based medicine. A new approach to teaching the practice of medicine. *Journal of the American Medical Association*, 268, 2420–2425.
- Fineberg, H. V. (2003). Traditional distinctions between public health and medicine (Table 5-1). In K. Gebbie, L. Rosenstock, & L. M. Hernandez (Eds.), *Who will keep the public healthy? Educating public health professionals for the 21st century* (p. 133). Washington, DC: National Academies Press. Retrieved from <http://www.nap.edu/books/030908542X/html>
- Fink, A. (2005). *Evaluation fundamentals: Insights into the outcomes, effectiveness and quality of health programs* (2nd ed.). Thousand Oaks, CA: Sage.
- Garrido, E. F., Culhane, S. E., Raviv, T., & Taussig, H. N. (2010). Does community violence exposure predict trauma symptoms in a sample of maltreated youth in foster care? *Violence and Victims*, 25, 755–769.
- Goodpaster, B. H., DeLany, J. P., Otto, A. D., Kuller, L., Vockley, J., South-Paul, J. E., et al. (2010). Effects of diet and physical activity interventions on weight loss and cardiometabolic risk factors in severely obese adults. *Journal of the American Medical Association*, 304, 1795–1802.
- Grembowski, D. (2001). *The practice of health program evaluation*. Thousand Oaks, CA: Sage.
- Hardy, L., King, L., Kelly, B., Farrell, L., & Howlett, S. (2010). Munch and move: Evaluation of a preschool healthy eating and movement skill program. *International Journal of Behavioral Nutrition and Physical Activity*, 7(1), 80.
- Honoré, P. A., & Scott, W. (2010). *Priority areas for improvement of quality in public health*. Washington, DC: U.S. Department of Health and Human Services. Retrieved from <http://www.hhs.gov/ash/initiatives/quality/quality/improvequality2010.pdf>
- Iglehart, J. K. (2009). Prioritizing comparative-effectiveness research—IOM recommendations. *New England Journal of Medicine*, 361, 325–328.
- Jenicek, M. (1997). Epidemiology, evidenced-based medicine, and evidence-based public health. *Journal of Epidemiology*, 7, 187–197.
- Kohatsu, N. D., Robinson, J. G., & Torner, J. C. (2004). Evidence-based public health: An evolving concept. *American Journal of Preventive Medicine*, 27, 417–421.

- Marshall, B. J., & Warren, J. R. (1984). Unidentified curved bacilli in the stomach patients with gastritis and peptic ulceration. *Lancet*, *323*, 1311–1315.
- McGinnis, J. M., & Foegen, W. H. (1993). Actual causes of death in the United States. *Journal of the American Medical Association*, *270*, 2207–2212.
- Mier, N., Medina, A. A., & Ory, M. G. (2007). Mexican Americans with type 2 diabetes: Perspectives on definitions, motivators, and programs of physical activity. *Preventing Chronic Disease*, *4*, 01-Fink (Evidence)-46812 A24.
- Sackett, D. L., Rosenberg, W. M. C., Gray, J. A. M., Haynes, R. B., & Richardson, W. S. (1996). Evidence-based medicine: What it is and what it isn't. *BMJ*, *312*, 71–72.
- Sackett, D. L., Straus, S. E., Richardson, W. S., Rosenberg, W., & Haynes, R. B. (2000). *Evidence-based medicine: How to practice and teach EBM* (2nd ed.). New York, NY: Churchill and Livingstone.
- Sox, H. C., & Greenfield, S. (2009). Comparative effectiveness research: A report from the Institute of Medicine. *Annals of Internal Medicine*, *151*, 203–205.
- Stein, B. D., Jaycox, L. H., Kataoka, S. H., Wong, M., Tu, W., Elliott, M. N., et al. (2003). A mental health intervention for schoolchildren exposed to violence: A randomized controlled trial. *Journal of the American Medical Association*, *290*, 603–611.
- Tsai, S. L., Chen, M. B., & Yin, T. J. (2005). A comparison of the cost-effectiveness of hospital-based home care with that of a conventional outpatient follow-up for patients with mental illness. *Journal of Nursing Research*, *13*, 165–173.
- Tunis, S. R., Stryer, D. B., & Clancy, C. M. (2003). Practical clinical trials: Increasing the value of clinical research for decision making in clinical and health policy. *Journal of the American Medical Association*, *290*, 1624–1632.
- Vaughan, R. (2004). Evaluation and public health. *American Journal of Public Health*, *94*, 360.
- Vincus, A. A., Ringwalt, C., Harris, M. S., & Shamblen, S. R. (2010). A short-term, quasi-experimental evaluation of D.A.R.E.'s revised elementary school curriculum. *Journal of Drug Education*, *40*, 37–49.
- Winslow, C.-E. A. (1920). The untilled fields of public health. *Science*, *51*, 23–33.