American Journal of Community Psychology, Vol. 31, Nos. 3/4, June 2003 (© 2003)

Community Science: Bridging the Gap Between Science and Practice With Community-Centered Models

Abraham Wandersman[1]

A major goal of community science is to improve the quality of life in our communities by improving the quality of the practice of treatment, prevention, health promotion, and education. Community science is an interdisciplinary field, which develops and researches community-centered models that enable communities to use evidence-based interventions more effectively and efficiently. In this paper, the gap between science and practice and the need to bridge the gap with new models serve as an entry point and guide to the development of a community science. Therefore, the paper describes (1) the "prevention science" model of bringing science to practice, (2) why this model is necessary but not sufficient for influencing the quality of interventions in our everyday world, (3) the gap between science and practice and the need to integrate "prevention science" models with community-centered models in order to bridge the gap, and (4) features of community science.

KEY WORDS: community science; community psychology; gap between research and practice; prevention science.

The quality of life in our communities is frequently measured in lists of frightening statistics about rates of divorce, families living in poverty, AIDS, cancer, obesity, and so forth (e.g., KIDS COUNT, state department of health vital statistics). Each of these indicators has psychosocial as well as health and mental health consequences. Long ago, scientists and public health experts realized the obvious—we must get our research about what works into communities because we cannot merely expect that people will come into an office and receive a vaccine that can treat (let alone prevent) the medical and mental health problems that challenge society. The experts concluded that we must have better evidence-based interventions and have outreach into the communities. As a result community-wide interventions and community mobilization strategies have become popular. The record of success for community-wide interventions in public health (e.g., heart disease, cancer control, smoking cessation, and substance abuse prevention) is mixed (some interventions achieved outcomes, quite a few did not demonstrate outcomes; Kreuter, Lezin, & Young, 2002; Wandersman & Florin, in press). Some studies, such as the Hallfors, Cho, Livert, and Kadushin (2002) evaluation of the Fighting Back substance abuse prevention coalition initiative, even suggest that the community interventions can have negative effects on communities.

Studies like Hallfors et al. (2002) raise important issues about strategies and expectations and stir controversy among funders, researchers, and practitioners. For example, the Hallfors et al. study led to a newspaper story (Grossman, UPI 2002) in Q1 which researchers argued that community coalitions often do not select proven evidence-based programs; program evaluators argued that the theory of the strategy may have been flawed (e.g., coalitions become too diffuse when they try to bring in too many partners), and funders argued that there is a learning curve and that coalitions are now doing a better job. (Interestingly, the newspaper story did not ask community members involved in the coalitions what they thought.)

[1]To whom correspondence should be addressed at Department of Psychology, University of South Carolina, Columbia, South Carolina 29208; e-mail: wanderah@gwm.sc.edu.

0091-0562/03/0600-0227/0 © 2003 Plenum Publishing Corporation

The issues raised in the controversy go far beyond whether community coalitions can prevent substance abuse; they emphasize fundamental issues about research, practice, and funding that should influence how researchers, practitioners, community members, and funders do what they do in prevention, treatment, and education in our communities:

- Why is there a gap between science and practice?
- What is the dominant scientific paradigm for developing research evidence and disseminating it?
- Why is this science model necessary but not sufficient?
- What is the responsibility of the practitioner to deliver evidence-based interventions and what is their capacity to do so?
- What is the responsibility of funders to promote the science of evidence-based interventions and to promote the practice of effective interventions in our communities?

The context and questions above lead me to the premise that a major concern of the sciences interested in the quality of life in our communities must be the quality of practice[2]—the interventions conducted every day by public health agencies, schools, criminal justice agencies, and so forth. The quality of practice should be influenced by research knowledge. The existing gap between research and practice is a major concern to scientists, practitioners, and funders. In this paper, I will use the theme of bridging the gap between science and practice to establish the need to develop an interdisciplinary community science. I will use the example of prevention to develop the case for understanding basic issues about the gap between science and practice and for bridging that gap. First, I will describe the "prevention science" model of bringing science to practice. Second, I will describe why this predominant model is necessary but not sufficient for influencing the quality of interventions in our everyday world. Third, I will address the gap between science and practice and the need to integrate "prevention science" models with community-centered models in order to bridge the gap. Finally, I will outline some of the features of community science; an interdisciplinary field devoted to developing a science that improves the quality of life in our communities. Notable priorities of community science include (1) explicit emphasis on integrating research and practice and (2) the community and the world of practice as an active stimulus and participant in research. The development of a community science will require a participatory process of many fields and participants: in this paper, I will lay a groundwork for a community science and encourage a participatory process to further its development.

[2]For the sake of keeping the writing simpler, I often use the term *practice* generally to connote the world of practice which has roles for professionals (e.g., public health specialists, master's level prevention specialists, physicians, and teachers) and community volunteers and leaders.

A "PREVENTION SCIENCE" PARADIGM: THE PREVENTIVE INTERVENTION RESEARCH CYCLE

The dominant intervention science paradigm is based on a biomedical model developed at the National Institutes of Health. A preventive intervention research cycle paradigm is well established in the prevention literature. It provides a sequence for producing high-quality evidence showing that an intervention works. For example, the Institute of Medicine report on Reducing Risks for Mental Disorders (Mrazek & Haggerty, 1994) has a five box model (Fig. 1) that (1) begins with basic research (e.g., epidemiology, neuroscience, genetics) and identifies the problem or disorder and its causes; (2) reviews research to develop an intervention, with an emphasis on risk and protective factors: (3) designs and conducts pilot and confirmatory intervention trials (efficacy trials); (4) extends the interventions developed in efficacy trials to large-scale trials in multiple sites with multiple investigators to assess generalizability (effectiveness trials); and finally (5) promotes large-scale implementation of the preventive intervention program into the community. This is a basic scientific paradigm for developing interventions for pharmaceuticals, treatment interventions, and prevention interventions.

The adoption of social innovations generally relies upon bringing research to practice. Price, Friedland, Choi, & Caplan (1998) note that the dominant paradigms attempt to bring research to practice through either a *technology transfer* approach in which the innovation is a relatively fixed technology and the practitioner or organization is a passive recipient of the innovation and would adjust to the product (implementation is a mechanical process dominated by the technology) or a *perfect replication* approach in which the assumption is that if the research evidence

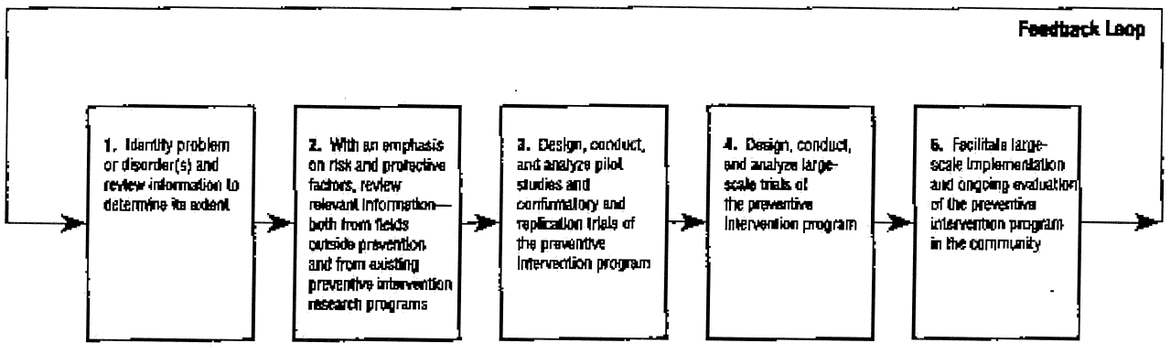

Fig. 1. The preventive intervention research cycle. Preventive intervention research is represented in boxes three and four. Note that although information from many different fields in health research, represented in the first and second boxes, is necessary to the cycle depicted here, it is the review of this information, rather thatn the original studies, tht is considered to be part of the preventive intervention research cycle. Likewise, for the fifth box, it is the facilitation by the investigator of the shift from research project to community service program with ongoing evaluation, rather than the service program itself, that is part of the preventive intervention reserach cycle. Although only one feedback loop is represented here, the exchange of knowledge among researchers and between researchers and community practitioners occurs throughout the cycle.

is substantial (e.g., effectiveness trials) then the innovation should be adopted as in the original (with only minor changes allowed).

"PREVENTION SCIENCE" IS NECESSARY BUT NOT SUFFICIENT

"The Gates Foundation pursues academic solutions to killer diseases, but it also works to remove some of the absurd obstacles to health that are so common in the developing world. Even the poorest countries can usually obtain the half-dozen vaccines that American kids have received for the past half century. Yet many still lack the "infrastructure"—nurses, syringes, and refrigerators—to deliver them. According to protocol, for instance, fieldworkers usually discard a vaccine if they're unsure of its freshness—a precaution that results in immense waste" (*Newsweek*, 2002, p. 48).

The above quote typifies the approach that there is a magic bullet or vaccine or packaged intervention that science has developed and now all we need is to get practitioners to use it. There are many strengths to this paradigm; it has provided many breakthroughs in medical treatment, psychological treatment, and prevention. There are also limitations to this paradigm. While there are limitations in terms of boxes 1–4 (such as problems with randomized control trials in community interventions, within-group variation, selectivity of participants, see e.g., Green, 2001), our major focus in this paper is on the gap between boxes 4 and 5. This gap is well known as a gap between research and practice. The preventive intervention research cycle approach of bringing science to practice does not appear to have led to the widespread adoption of science-based interventions in communities that is hoped for (Ringwalt et al., 2002; Wandersman & Florin, in press). For example, DARE programs have been adopted in 80% of the elementary schools in the United States but systematic reviews (e.g., Enett et al., 1994; General Accounting Office, 2003) show that DARE has limited effectiveness compared to other programs. Interventions with more evidence of success (e.g., Botvin, Baker, Dusenbury, Botvin, & Diaz, 1995) are used much less frequently because of cost, political difficulty, and other factors. This gap has caused great consternation among scientists and funders.

In a very thoughtful and provocative paper, Green (2001) asks, "Where did the field get the idea that evidence of an intervention's efficacy from carefully controlled trials could be generalized as the 'best practice' for widely varied populations and situations?" (p.). Green says that this assumption **Q2** has been inherent in the beginning of every field of engineering and human service. It is apparent that the laws of physics and the science of agriculture can be applied fairly consistently in different situations. As you move to medicine, medical interventions are likely to have similar effects across people, adjusting dosage for age, sex, and size. However, the

P1: GDX
American Journal of Community Psychology [ajcp] pp860-ajcp-465915 April 21, 2003 14:27 Style file version May 31, 2002

social and behavioral aspects of psychosocial interventions need to be adjusted to fit with social, cultural, and economic conditions of an individual. When you intervene with organizations and systems (e.g., schools and communities), the complexities that influence a packaged intervention are enormous. Green notes several specific gaps between research and practice:

1. the gap between efficacy of best practices created by research and effectiveness when implemented by practitioners;
2. the gap between "best practices" research and most appropriate adaptation when adopted for a particular target population;
3. the gap between achieving individual behavior change with middle class versus lower class;
4. the gap between research-driven (operate from research-centered medical models) roles versus roles that local practitioners, community groups, agencies, and governments need to play to ensure that future research is useful to local needs.

Wandersman and Florin (in press) also suggest that a major gap exists between science and practice and that the technology transfer approach typically used in the "prevention science" paradigm may have some of the limitations of a "trickle-down" approach. The gap indicates that prevention science has insufficiently affected the capacities of practitioners, citizens, community agencies, and organizations to plan and implement effective prevention programs. Similar gaps exist between science and practice in mental health treatment (e.g., Nathan, 2002) and education (e.g., Feuer, Towne, & Shavelson, 2002). Unfortunately, I do not have the time and space to pursue the similarities in the gaps and in the solutions in the treatment and education fields in this paper.

While the typical approach being taken by many funders is to emphasize the need to bring research to practice, Morrissey et al. (1997) argue that the gap between research and practice is a two-way gap. Researchers need a better understanding of the world of practice, and bidirectional arrows are needed between boxes 4 and 5 in Fig. 1. In a bidirectional model of the gap, we can begin with the community and the practitioner and have the practitioner ask questions about the research that suggest why a gap between science and practice exists:

- Do I have the same resources as the experimenters? (An accessibility gap)
- How different is their situation of practice from mine? (A credibility gap)
- Is it really necessary for me to strive for such lofty goals in my practice? (An expectations gap; Lancaster, 1992).

In this paper, I propose that we need *community-centered models* to complement the prevention intervention research cycle model. Community-centered models begin with the community and ask what it needs in terms of scientific information and capacity building to produce effective interventions.

HOW TO BRIDGE THE GAP BETWEEN SCIENCE AND PRACTICE

If we proceed with a bidirectional view of the gap and we begin with the practice/community (rather than end with it), we expand the possibilities for understanding and bridging the gap. For example, the U.S. Preventive Services Task Force (1996) reviewed the literature on clinical preventive services and provided guidelines which can influence what will be reimbursed by Medicare or Medicaid; similarly the Centers for Disease Control and Prevention's community preventive services guidelines (2000) can guide funding via block grants to influence state and local agencies to provide better preventive and health promotion practices. Green (2001) proposes that the political and economic force of these guidelines (that are based on empirical evidence) can have greater influence than the hope that the publication of systematic reviews of controlled studies will be read by and affect practitioners.

> Green argues that we need
> best practices for the process of planning for the most appropriate interventions for the setting and population. We should not expect to be exempted from the evidence-based requirements now imposed on other fields of health practice, but the evidence brought to bear should be tested methods of intervention combined with procedures and theories to achieve the appropriate fit between the possible methods and the targeted population's circumstances. (p. 173)

Green proposes a number of characteristics that could operationalize this approach: (1) "best practice" as process rather than as packaged interventions; (2) emphasize control by practitioner, patient, client, community, or population; (3) emphasize local evaluation and self-monitoring; and (4) research on the tailoring process and new technologies.

1. *"Best practice" as process rather than as packaged interventions.* "A common misunderstanding about health promotion research is that it seeks or should seek a magic bullet, a package to put on a shelf in any community where professionals can pull it off and apply it" (Green, 2001). Green proposes that we should be (1) developing and promoting quality processes for practitioners to use in planning and implementing effective interventions, and (2) matching practitioner capacity with appropriate processes for implementing interventions that fit community needs.
2. *Emphasize control by practitioner, patient, client, community, or population.* Practitioners, patients, clients, citizens, residents, and communities should not be considered to be passive recipients of scientific information. In many cases, science is not clear-cut (e.g., controversies about mammography and about estrogen replacement therapy). In addition, practitioners, citizens, and communities have rights and responsibilities in choosing among alternatives. The literature on citizen participation (e.g., Churchman, 1987; Heller, Price, Reinharz, Riger, & Wandersman, 1984; Wandersman and Florin, 2000) suggests that people feel more control and buy into an option when they have an influence on the decisions that affect them. Participation can also lead to better decisions being made because they include the input of consumers who have "expert" knowledge about themselves or those they work with and that gets included in the decision making. In addition, Green and others (Green, 2001; Green & Mercer, 2001), Kelly and others (Tandon, Azelton, Kelly, & Strickland, 1998; Tandon, Kelly, & Mock, in press), Jason et al. (xxxx), and Wandersman, Chavis, and Stucky (1983) propose that participatory research can make research more relevant to consumers, influence the quality of the research, and increase buy-in and attention to research findings.
3. *Emphasize local evaluation and self-monitoring.* Green (2001) and Green and Kreuter (1999) propose (in the Precede–Proceed model) that using "best practice" well in a local situation involves local users monitoring the implementation and evaluating its achievements. This is consistent with the empowerment evaluation (EE) approach to program evaluation (Fetterman, Kaftarian, & Wandersman, 1996). EE aims to increase the likelihood that programs will achieve results by increasing the capacity of program stakeholders (any individual, group, or organization that has an important interest in how well a program functions) to plan, implement, and evaluate their own programs (Wandersman & Florin, in press). Fetterman (2001) defines *empowerment evaluation* as "the use of evaluation concepts, techniques, and findings to foster improvement and self-determination" (p. 3). Wandersman's description of EE (Wandersman, 1999, p. 96) places an explicit emphasis on results:

> The goal of empowerment evaluation is to improve program success. By providing program developers with tools for assessing the planning, implementation, and evaluation of programs, program practitioners have the opportunity to improve planning, implement with quality, evaluate outcomes, **Q3**

4. *Research on the tailoring process and new technologies.* Tailoring the vast research information that has been produced to fit an individual client, class, school, or neighborhood is one of the major challenges facing the world of practice. It is much easier to promote manualized curricula and fidelity to the original intervention (Eliot, 1998) than to provide adaptation to fit the needs and context of an individual or system (Backer, 2002). Guidance on implementation with fidelity and quality adaptation will be essential. Green describes three types of products that may bridge what has been a forbidding challenge.
   a. *Expert Systems.* Expert system software guides the user with a knowledge base to help make decisions that are guided by expert knowledge. Expert systems often have branching decision trees that guide the user through a sequence of decisions.
   b. *World Wide Web.* The world wide web provides information to users instantaneously. Local archival data and research papers can be obtained quickly by anyone with a computer link.
   c. *Possibilities of synthesizing research from sources other than randomized trials.* Green notes that the possibility exists in 1 and 2 above to blend information from

research literature with information about local people and the local community's characteristics (obtained from census data, vital statistics, surveys, content analysis of media, etc.) "to match information from scientific sources with the evidence from the community" (p. 175).

GTO: AN EXAMPLE OF A SYSTEM THAT CAN HELP BRIDGE SCIENCE AND PRACTICE

To recap: The major responsibility for results rests with the world of practice. As has been widely noted, the results in the everyday world are often disappointing. The general stance from scientists and policymakers has been that if we produce more science and disseminate it to the community, then the practitioners will be more effective. However, the gap between science and practice has been a chasm. The previous section proposes innovative ideas for bridging the gap between science and practice that places the major control and the tools, as well as the responsibility, in the hands of the community (e.g., practitioner, citizen, principal, and teacher). There is plenty of research information "out there" and technologies exist that are accessible to the practitioner. What might a system look like that asks the practice world to be accountable for results and helps the practitioner reach results using science and "best practices"?

Getting To Outcomes: A Results-Based Approach to Accountability

My colleagues and I have been developing a results-based approach to accountability that bridges research and practice and will illustrate the features that Green proposes. A workbook, *Getting To Outcomes: Methods and Tools for Planning, Evaluation, and Accountability* (GTO), was developed as an approach to help practitioners plan, implement, and evaluate new or existing programs to achieve results (Wandersman, Imm, Chinman, & Kaftarian, 1999, 2000). GTO is based on answering 10 accountability questions. By answering the questions well, program developers increase their probability of achieving outcomes and demonstrate their accountability to stakeholders.

1. What are the needs and resources in my organization/school/community/state?
2. What are the goals, target population, and desired outcomes (objectives) for my school/community/state?
3. How does this program incorporate knowledge of science and best practice in this area?
4. How does this program fit with other programs already being offered?
5. What capacities do I need to put this program into place with quality?
6. How will this program be carried out?
7. How will the quality of program implementation be assessed?
8. How well did the program work?
9. How will continuous quality improvement strategies be incorporated?
10. If the program (or components of the program) is successful, how will the program be sustained?

Addressing the 10 questions involves a comprehensive approach to results-based accountability that includes science and "best practices" and much more. It includes needs and resource assessment, identifying goals, target populations, desired outcomes (objectives), science and best practices, logic models, fit of programs with existing programs, planning, implementation with fidelity, process evaluation, outcome evaluation, continuous quality improvement, and sustainability (Wandersman et al., 2000; see Table I for the questions and literatures that help answer the questions). It should be clear from the description and table that Step 3—evidence-based interventions (e.g., the prevention intervention research cycle)—is a crucial part of results-based accountability; it should also be clear that a practitioner, school, or an agency must take more into account (all of the other steps) to have an effective intervention.

The GTO system includes a workbook (available on the web) and tools (measures, checklists). Zhang and Wandersman (2002) have received a technology transfer research grant from the National Institute on Drug Abuse to integrate GTO into an interactive web-based technology system. The interactive web-based GTO system (called *i*GTO) will be particularly useful in "going to scale" in multisite interventions and agencies. The system will have the characteristics that Green proposed as "alternatives to 'best practices.'" The system (1) is a systematic process for planning, implementing, and evaluating interventions rather than a packaged intervention; (2) places major control in the hands of practitioners by building the capacity to perform the essential ingredients

Table I. Ten Accountability Questions, Related Learning Objectives, and Tools in GTO

Accountability questions	Learning objectives	Getting to outcomes tools
1: What are the underlying needs and conditions that must be addressed?	1. To know why they ought to conduct a needs and resources assessment 2. To have a general understanding of how to gather some needs data, assess risk and protective factors, and determine the underlying causes of the problem	Needs Assessment Checklist Resource Inventory
2: What are the goals, target populations, and objectives (i.e., desired outcomes)?	1. To write realistic goal statements on the basis of information from AQ1 2. To create realistic and measurable objectives (i.e., desired outcomes) that link to the goals (and are risk and protective factor-based) 3. To specifically define a target population	Goals/objectives/target population worksheets
3: Which science (evidence)-based models and best-practice programs can be useful in reaching the goals?	1. To understand science (evidence)-based models 2. To understand best-practice programs 3. To receive some ideas and resources to begin their search for science (evidence)-based models and best-practice programs	Best-practice lists from various sources Best-practice feasibility tool
4: What actions need to be taken so the selected program "fits" the community context?	1. To appreciate the importance of assessing program fit 2. To understand how new programs can enhance, duplicate, or detract from existing programs' effectiveness in achieving goals with the same target population	
5: What organizational capacities are needed to implement the program?	1. To know how to assess the organization's capacities in terms of staffing, technical abilities, and funding 2. To know specific indications of commitment to the program	
6: What is the plan for this program?	1. To appreciate the importance of planning 2. To know how to use the *Getting To Outcomes* planning tools to create comprehensive plans 3. To know how to use the *Getting To Outcomes* planning tools to incorporate the local cultural context into the plans	Plan Quality Checklist Implementation Form, part 1 Cultural Competence Checklist
7: How will the quality of program/initiative implementation be assessed?	1. To know how to assess the quality of meetings 2. To know how to assess the degree to which planned activities were implemented 3. To know about program fidelity and why it is important 4. To know how to track lessons learned 5. To know how to make midcourse corrections in programs 6. To appreciate the importance of monitoring implementation over time	Implementation Form 2–4 Meeting Effectiveness Inventory Meeting Minutes Form Consumer Satisfaction Surveys Project Insight Form
8: How well did the program work?	1. To know how to design a basic outcome evaluation which includes choosing the right design, data collection methods, and data analysis methods 2. To learn basic data analysis techniques (i.e., means, frequencies) 3. To know more how to conduct an ethical evaluation by addressing issues of consent, confidentiality, and anonymity 4. To know how to determine the program's effectiveness by combining process evaluation information (AQ7) with outcome evaluation information 5. To be better prepared to work with outside consultants	Outcome Data Sheet
9: How will continuous quality improvement strategies be incorporated?	1. To know how to systematically use information from the previous steps to improve their programs during the next implementation	Continuous Quality Improvement Worksheet
10: If the program is successful, how will it be sustained?	1. To know several ways to systematically pursue additional funding to sustain good programs	

for effective interventions (the 10 steps of GTO) and places a large degree of responsibility in their hands for being accountable for the decisions made; (3) encourages monitoring and self-evaluation in each of the 10 steps with checklists and measures; and (4) provides the technological tools and information to blend science with local conditions and information using (a) expert system guidance, (b) web-based technology for information and calculations of their own data, and (c) customized information for the domain being targeted (e.g., substance abuse).

Given all of the weaknesses cited in this paper about getting innovations to be used, it is a high priority for us to research the utilization of *i*GTO. We have a grant from the Centers for Disease Control and Prevention to perform participatory research, using a quasiexperimental design, on the processes and outcomes related to utilization of GTO (Chinman, Wandersman, et al., 2002).

THE BEGINNINGS OF A COMMUNITY SCIENCE

In this section of the paper, I (1) discuss the need to study the infrastructure for service delivery as well as the content of prevention, (2) provide a definition of *community science*, (3) outline the features of community science, and (4) relate the features of community science to bridging the gap between science and practice.

Content and Infrastructure for Service Delivery

In the previous section, I proposed that to reach outcomes, we need evidence-based content that has been processed with quality (e.g., GTO) to fit the situation. As the Gates foundation example on p. 5 suggests, we also need a quality infrastructure (e.g., physician and syringe, hospital) to appropriately implement the content. Therefore, for any intervention to succeed, whether at the individual level (e.g., therapy) or at the organizational level (e.g., violence prevention programs for a school), it is necessary to have both appropriate content of the intervention and a good structure that delivers it. For example, achieving therapeutic outcomes requires both the use of evidence-based treatment strategies that fit the client and a trained therapist to deliver the treatment. Similarly, effective prevention programs require good content of the intervention and a good organizational structure to deliver the intervention. Federal agencies have been promoting the use of evidence-based practices by community agencies and collaborations (e.g., Center for Substance Abuse Prevention, National Institute on Drug Abuse, Department of Education, Centers for Disease Control and Prevention's Guides for Community Preventive Services).

Developing a more effective community infrastructure for interventions will require progress in two features of communities and their organizations: (1) the capacities to deliver effective interventions (e.g., the capacities to perform the 10 processes in GTO), and (2) the effective organizational structure and functioning that promote these capacities and keep the organization viable. As I discussed earlier, good progress has been made in developing methods for building the capacity of community stakeholders to better plan, implement, and self-evaluate programs (e.g., Center for Disease Control's PATCH program; Compton, Baizerman, & Stockdill, 2002; Fetterman, 2001; Francisco, Schultz, & Fawcett, 2002; MAPP website of the National Association of City and County Health Officials; Wandersman et al., 2000). In sum, methods and tools for improving the planning, implementation, and evaluation of programs are being developed to help practitioners.

What about the organizations that deliver the program (e.g., community coalitions, schools)? The intervention sciences—prevention science, treatment science, education science—have devoted little attention to the organizational features of the organizations that do the interventions. Yet, large literatures exist in sociology (e.g., Handel, 2002), political science (e.g., Kalleberg, Knoke, Marsden, & Spaeth, 1996), organizational psychology (e.g., Katz & Kahn, 1978), and other fields that could inform us about how communities and their organizations function, what their world is like and how the sciences fit in with their world (rather than how the "real world" must fit into traditional science paradigms). There is a need for a community science that starts with the community and its values and perspectives and that integrates intervention science models into it. Below, I begin to define and describe *community science*.

Toward the Development of a Community Science

Definitions

To develop a definition of *community science*, I first looked at definitions of *science* and *areas of psychology* that have been linked to the term *science* (e.g., developmental science, prevention science). I found the American Physical Society's

(the professional Physics association in the United States) statement on "What is Science" an important starting point.

Science extends and enriches our lives, expands our imagination and liberates us from the bonds of ignorance and superstition. The American Physical Society affirms the precepts of modern science that are responsible for its success.

Science is the systematic enterprise of gathering knowledge about the universe and organizing and condensing that knowledge into testable laws and theories.

The success and credibility of science are anchored in the willingness of scientists to:

1. Expose their ideas and results to independent testing and replication by others. This requires the open exchange of data, procedures and materials.
2. Abandon or modify previously accepted conclusions when confronted with more complete or reliable experimental or observational evidence.

Adherence to these principles provides a mechanism for self-correction that is the foundation of the credibility of science. (American Physical Society website, 2002)

This definition provides a value for science, a methodological process that is conceptual, and methods that are experimental or observational.

There are at least two motives for adding the term *science* to fields that have names in psychology—for example, clinical science, cognitive science, developmental science, prevention science. One motive may be to wrap areas of psychology in the mantle of prestige of the term *science*. A second motive is to promote the idea of interdisciplinary contributions, for example, the Cognitive Science Society "brings together researchers from many fields who hold a common goal: understanding the nature of the human mind. The Society promotes scientific interchange among researchers in disciplines comprising the field of Cognitive Science, including Artificial Intelligence, Linguistics, Anthropology, Psychology, Neuroscience, Philosophy, and Education" (Cognitive Science Society webpage).

Cates (1995) describes prevention science (it is also quoted on the Society for Prevention Research homepage) somewhat similarly:

> The new term 'prevention science' may allow us all to get under the same semantic umbrella. Although the techniques of descriptive, analytic, and experimental epidemiology provide the conceptual etiological backbone for this umbrella, its inclusive nature is defined by the myriad of complementary fields composing the breadth of the 'Prevention Science Umbrella' (i.e., anthropology, sociology, political science, communications, epidemiology, economics, statistics, managerial science, laboratory science, preventive medicine). Whether we deal with the most qualitative of public health methods (for example, the ethnographic research of anthropologists) or the most quantitative mathematical models of economists, the intent of using the term prevention science is to show its inclusive, rather than exclusive nature.
>
> 'Prevention science' is a collection of diverse fields that, when used together, creates a whole of prevention knowledge greater than the sum of its component parts. If all our disciplines get under the umbrella, we can act as better scientific advocates for our prevention causes. (Cates, 1995, p. 211)

It is clear to me that the term *community science* has the second motive—it must clearly be an interdisciplinary and transdisciplinary area.

Defining "Community Science"[3]

The following premise sets the stage for the development of an interdisciplinary community science. The discussion below emphasizes themes discussed in this paper about the importance of interventions

[3]My literature search of the term *community science* revealed that the term has been used to describe educational approaches in the public schools that involve students in science projects in the community. The values of this approach to community science are congruent with the values of community science proposed in this paper.

COMMUNITY SCIENCE is the philosophy that

a) EDUCATIONALLY, the content areas of Science, Social Studies, and Math can be studied simultaneously to gain an understanding of how the combined knowledge gained from each can help a student understand more about his surroundings;

b) ENVIRONMENTALLY, this gained knowledge can be applied toward the betterment of the student's household, neighborhood, and community.

WITH COMMUNITY SCIENCE, STUDENTS WILL

LEARN important issues and topics in science-related fields, and how this knowledge relates to our world today;

USE what they learn to improve the quality of own lives, their families, and their communities;

APPLY this experience to make their own communities models from which others will follow and learn Charles N. Fulco's The Green Science website, http://charles_fulco.tripod.com/communityscience/od7.html).

in the everyday world, community-centered models, and new ways of bridging science and practice.

Premise. The quality of life in our communities is influenced by the effective and efficient functioning of formal systems (e.g., public health agencies, criminal justice agencies, schools) and the supportive functioning of informal systems (e.g., family, neighbors). Each of us is directly affected by the practitioners (e.g., therapists, doctors, teachers, police, community volunteers). Therefore, the practice of treatment, prevention, and education has great everyday influence on our quality of life.

Brief Description of Community Science. A goal of community science is to improve the quality of life in our communities by improving the quality of the practice of treatment, prevention, health promotion, and education. Community science develops and researches community-centered models that enable communities to use evidence-based interventions more effectively and efficiently. Community-centered models embrace a science of community that includes (1) community influences on individual, family, and other subsystems; (2) the influence of individuals, families, and other systems on the structure and functioning of community systems (e.g., citizen participation, community mobilization, school improvement councils, voting); and (3) power, influence, and policy (e.g., sociological and political science models of power). Community science is multidisciplinary, interdisciplinary, and transdisciplinary—drawing upon anthropology, biomedical sciences, education, political science, psychology, prevention science, public health, social work, sociology, and related fields.

In treatment and prevention, the dominant scientific paradigms create science with an intervention cycle model that uses efficacy and effectiveness trials and attempt to bring science to communities as a packaged intervention (e.g., magic bullets, vaccines, manualized curricula). These paradigms have made many important contributions to our quality of life. However well-intentioned, the paradigms have limitations that have contributed to gaps between research and practice. Community science attempts to bridge the gaps by developing and researching community-centered models geared to the complexities and realities of communities, and by integrating community-centered models with the intervention cycle models that bring science to practice in communities. This synthesis should improve the quality of the practice of treatment, prevention, and education and the quality of community functioning.

Features of Community Science

The disciplines that can contribute to community science have vast relevant literatures. These literatures can serve as a base to inform community science now. As community science takes shape and its features and needs are described, new areas for basic research and applied research will be evident. Below, I outline some of the features of community science.

Values-Linked

Community science has a clear value orientation. Initially, it can draw upon the values of community psychology described in Dalton, Elias, and Wandersman (2001). Community psychology values are individual wellness, sense of community, social justice, citizen participation, collaboration and community strengths, respect for human diversity, and empirical grounding.

Participatory

Community science places a great deal of emphasis on individuals, organizations, and communities not being passive recipients of their environment; rather it places importance on them being active and responsible and having rights and responsibilities. Literatures exist in many disciplines that empirically demonstrate the benefits of participation (Churchman, 1987; Wandersman & Florin, 2000), feelings of control and "buy-in" (Dryfoos, 1990; Schorr, 1997) in the efficacy of interventions. Also, theories and evidence demonstrate the importance of participatory methods of research for enhancing the quality of research and buy-in to research in public health (Green & Mercer, 2001), community psychology (Jason et al., xxxx; Tandon, Kelly, & Mock, in press), and evaluation (Cousins & Earl, 1992).

Scientific

Community science is theoretically and empirically grounded and generally consistent with the values (enriching lives, expanding imagination, liberating from ignorance), conceptual (gathering knowledge and organizing it into testable theories), and methodological approaches (experimental and observational) described in the American Physical Society's description of *What is Science* (p. 18–19 above).

Utilization

One way of bridging the gap between science and practice is the technology transfer approach (e.g., Backer, David, & Soucy, 1995). Generally, the technology transfer approach views the gap as representing a lack of information dissemination from science to practice and, therefore, works to improve this transfer of knowledge. It brings science to practice by disseminating proven programs through conferences, journal articles, and training workshops. Community science views dissemination as necessary but not sufficient. Its major emphasis is on the utilization of knowledge (Havelock, 1971). As discussed earlier, it is clear that a great deal of information is available via the web, and so forth; the key is having people use relevant information.

Systems-Oriented

Individuals are embedded within layers of social relationships—family, friendship networks, organizations, neighborhoods, and cultures and societies—and are often described in terms of ecological levels of analysis (Dalton et al., 2001). Bronfenbrenner (1979) has developed an extensive theory of the ecology of human development that postulates the relationships between different ecological levels (e.g., how societal events, such as September 11, can affect a parent's workplace and thereby affect a child).

Contextual

Historical, legal, political, economic, social–organizational, and cultural aspects of a community affect our behavior and therefore are likely to affect an intervention (Green, 2001). Interventions must take context into account and consider adaptations so that they are more likely to be effective. In addition, there are many social scientists who propose that research must be considered contextually, for example, contextual epistemology (Kingry-Westergaard & Kelly, 1990).

Longitudinal Research and Longer Timeliness

A longitudinal perspective improves community research. Studying phenomena over time helps us understand stability and change in communities. In reference to interventions, longitudinal designs help us understand the facilitators and barriers to change. Extensive theories of community change have emphasized that large-scale community change and obtaining results on population indicators (e.g., levels of AIDS in a state, scores on a school readiness test in a large city) take a long time to accomplish (e.g., Connell, Kubisch, Schorr, & Weiss, 1995). Some funders are recognizing this and providing funding for 10 years to a community change project (e.g., Robert Wood Johnson Foundation and its Fighting Back initiative).

Additional Standards of Evidence to p Level

The psychological significance or quality of life significance of findings should be considered in addition to whether or not an intervention has a achieved a probability at the less than .05 level. Because *p* levels confound sample size and effect size, practical meaning becomes a major challenge that goes beyond simple numbers (M. Lipsey and B. Shinn, personal communication, 2002).

Capacity

Because there is an emphasis in community science on improving communities, community science research is interested in leaving more than specific research findings as a legacy. Community science is interested in building the capacity of community agencies and orgranizations to have more skills (e.g., evaluation capacity; Compton et al., 2002), and improved infrastructure (e.g., organizational functioning; Backer, 2002; Florin, Chavis, Rich, & Wandersman, 1992).

Community science is a very broad area and will require many approaches to understanding communities and community change. Price and Behrens (2003) discuss basic science, applied research, and applied engineering roles for science and practice. I forsee community science using all three of these approaches. In this paper, I use the gap between science and practice as a tangible entry point to the "world of community science." Although I have tended to emphasize application in this paper, the pursuit of systematic conceptual research will be essential.

The Gap Between Science and Practice: A Community Science Perspective of the Relationship of Researchers/Evaluators, Practitioners, and Funders

The gap between boxes 4 and 5 in the prevention intervention research cycle (Fig. 1) is a major

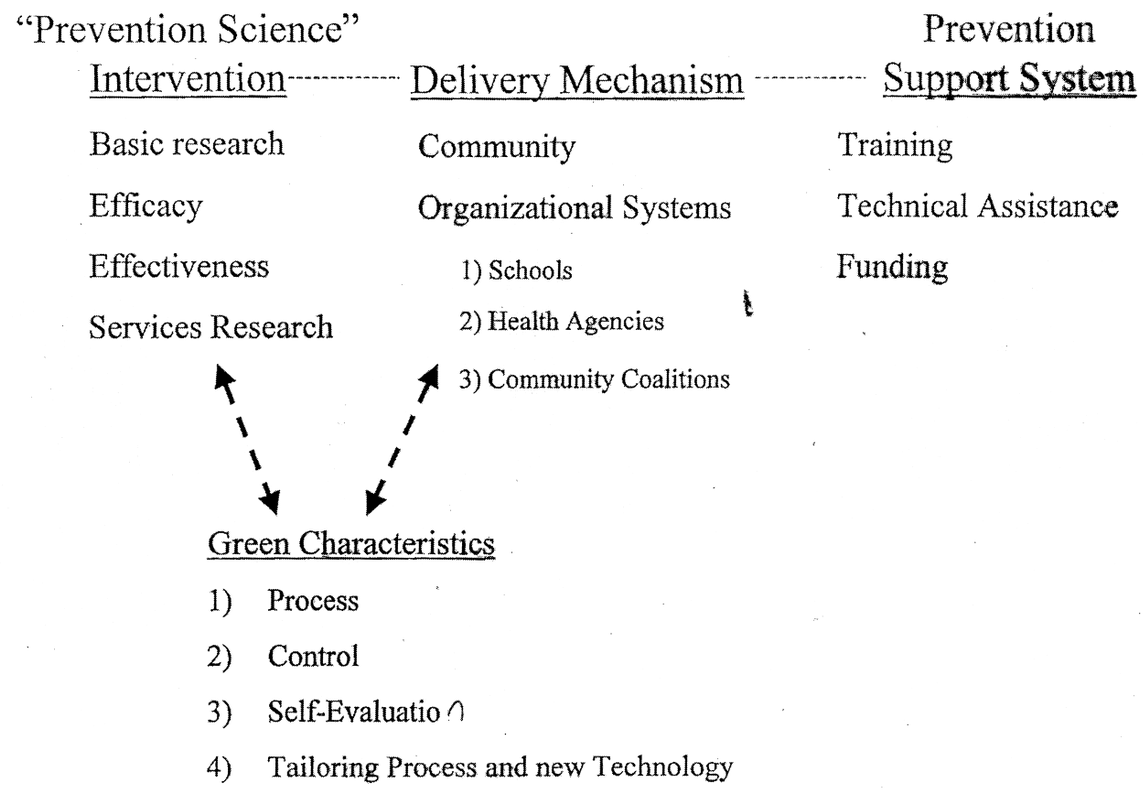

Fig. 2.

theme of this paper. In community science, we propose that the gap has bidirectional bridges and barriers. In Fig. 2, I use the GTO example and the Green features of alternatives to "best practices" to illustrate that the scientific information is created by researchers (column 1) and processed by the community infrastructure and its participants (column 2) in a way that the community (1) has a systematic process for implementing interventions, (2) has some control, (3) is monitoring and self-evaluating the intervention, and (4) is being guided by expert knowledge and using customized contextual information (the Green features linking columns 1 and 2). This figure reflects a number of the features in the description of community science: participatory and control, contextual, utilization, capacity development. The features of long-time, systems, and community significance are implicit, for example, the accountability questions suggest that it takes time to go through the process and the community will only use it if it has community significance.

Service systems research (column 1) is a promising approach to helping bridge the gap between science and practice. Service systems research is being developed at the National Institutes of Health. The National Institute of Mental Health Prevention Research Consortium developed a definition of prevention service systems research that extends the effectiveness model of box 4 to focus on the study of effective preventive interventions within service systems. These studies examine how organizational aspects of the service environment (e.g., skills of providers, organizational culture and climate, and methods of financing services) interact with preventive interventions.

> Preventive service systems research can include (1) studies of policies and procedures that facilitate or hinder the adoption and implementation of effective interventions, and research on the technology of effective dissemination; (2) studies of the effects of age, gender, ethnicity, or sociocultural factors that affect access to or use of available preventive interventions;

> and (3) studies of the costs associated with delivery of preventive interventions, as well as methods of financing such interventions. The focus of preventive service systems research is on contextual and system-level outcomes. (NIMH website, 1996)

Service systems research will be very helpful in the bridge between boxes 4 and 5. It brings organizational and contextual factors explicitly into the picture of examining what happens to effectiveness interventions in the community. However, this emphasis in services research appears to be on how the community system reacts to effectiveness interventions. A community science perspective would broaden this to a more reciprocal relationship and a more proactive stance on the part of the community systems performing the interventions.

The first two horizontal columns in Fig. 2 describe the roles of the researchers and the community participants; what about the funders and their organizational systems (third upper horizontal column in Fig. 2) that support or inhibit the community practice systems? Funders have a major role in influencing the quality of community practice systems via requirements, monetary resources, training, and technical assistance. In the Gates medical vaccine example described earlier, whether the vaccine is properly stored and administered depends on the quality of the medical system (e.g., the training of health workers and the equipment of hospitals). This quality is dependent upon the funding and quality of the broader public health establishment (e.g., the quality of medical schools, funding for appropriate equipment). Therefore, the quality of the practice (second column) is interdependent with the quality of the research and the quality of support from the funders and regulatory bodies (e.g., federal government, state health departments). Wandersman and Florin (in press) and Mitchell, Florin, and Stevenson (2002) discuss the importance of quality technical assistance systems to work with the practitioners in substance abuse prevention.

Ultimately, the accountability of each partner should include mutual accountability, as well as internal accountability. In other words, we need to develop an interactive accountability system with a results focus (Yost & Wandersman, 2000). In part, results will depend upon a collaborative accountability partnership in which the performance of each partner is enhanced by the other partners in ways that help each partner achieve results. A proposed image for this is a triple helix of accountability in which the strands of researcher, practitioner, and funder are interdependent and interwoven to promote results. This approach is intended to reduce the finger pointing and blame that commonly takes place among funders, researchers, and practitioners. In the collaborative accountability partnership, there is still accountability required of each partner. However, the interdependence is explicit and the roles of how each can enhance the performance of the other are built into the accountability system.

COMMUNITY PSYCHOLOGY AND COMMUNITY SCIENCE

In the descriptions earlier, I have relied heavily on what community psychology can contribute to community science. A relationship between psychology and community science is depicted in Fig. 3. One of the many areas to be considered is, how does community psychology relate to other areas of psychology in contributing to community science? For example, should community psychology act as a translator or funnel of research conducted in other areas of psychology to community science, should community psychologists promote collaborative projects among areas of psychology to develop more influential contributions to community psychology? Answers to these and many other questions will be based on the careful consideration of what psychology and community psychology, in particular, have to offer. Fortunately, these considerations have been taking place and are particularly cogent in efforts to examine the relationship between science and community psychology (e.g., Special Section in this issue).

A CONCLUSIVE BEGINNING

In the Introduction, I began with the issue of disappointing results in community interventions and the questions and challenges it raised for all of those concerned with improving the quality of life in our communities. Throughout the paper, I addressed the issues of why there is a gap between science and practice; why the intervention research paradigm is necessary but not sufficient; the importance of the world of practice delivering interventions that achieve results; a system that can be conceptualized as bridging research and practice by putting the methods, tools, and capacities into the hands of the practitioners; the need for internal accountability on the part of the researchers, the community and the funders; and the need for interdependent accountability systems for reaching results.

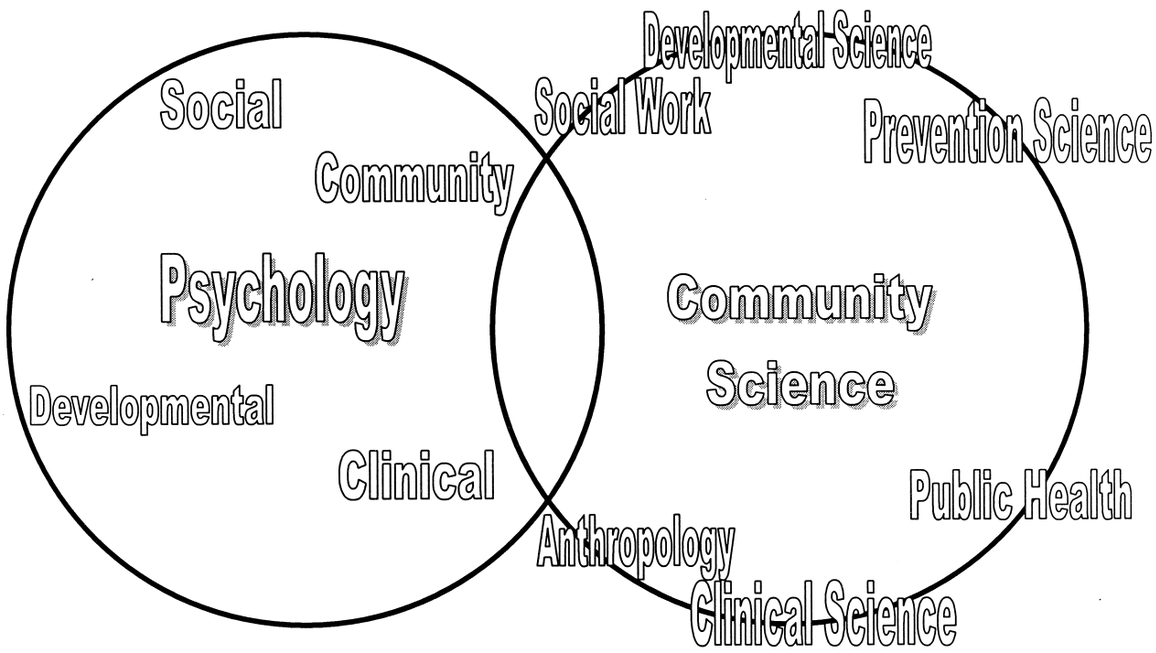

Fig. 3. The relationship of community psychology and community science.

In contrast to the Introduction, I conclude on a more optimistic note for community interventions. Positive community change can and does occur. For example, approximately at the same time that the Hallfors et al. (2002) study appeared, there were national reports and state reports that tobacco and drug use by youth substantially decreased. The national Monitoring the Future study surveys youth across the country and has found sharp declines in tobacco use and in certain illicit drugs such as ecstasy (Johnston, O' Malley, & Bachman, 2003). Potential explanations for smoking decline included increasing tobacco prices and negative publicity and ad campaigns about tobacco and the tobacco industry. A report from the state of Florida used the 2002 Florida Youth Substance Abuse Survey to claim that Florida youth drug use is down. Jim McDonough, the Director of Florida's Office of Drug Control, claimed that the key was parental involvement, communities and schools working together, legislative and judicial support, adequate resources, and the Governor's leadership. While the reports do not study cause–effect links and cannot verify the explanations they offer, it is likely that some strategies in the states and in the communities changed to achieve the reported results. Wandersman and Florin (in press) and Green (2001) report cases where state and community initiatives have led to positive change. These include initiatives in which the community had the major responsibility (community-driven).

We can and must learn from community-centered models on what worked and what did not and why (theory); we must contextualize and customize the information and build capacity in communities to appropriately implement evidence-based information. Then, we must deliberately do a better job of systematically integrating science and practice in community-centered models. Community science, using community-centered models, can be a powerful contributor to our understanding of individual and community change and to the quality of life in society. Researchers working together with funders, practitioners, and community members can develop a full-scale community science.

ACKNOWLEDGMENTS

This paper has its roots in my Society for Community Research and Action presidential address of

August 2002 "Community science: 'Prevention science' is necessary but not sufficient." I dedicated my presidential address and am dedicating this paper to my sister Celia June Wandersman, whose very early death was due to bad medical practice; my mother Hadassah Wandersman, who nurtured me and whose death from cancer was due to limitations in science and practice; to my wife Lois, who has enriched me all of my adult life and is a cancer survivor due to advances in science and practice. Their experiences and my experiences with them have influenced my intense interest in the quality of science and practice. This paper is also dedicated to Jim Kelly, who bolsters the spirit of community psychology and community psychologists everywhere and whose life was saved because of the quality of science and practice. In all of these cases, the quality of the practice was the proximate factor. I also dedicate this paper to Ed Devereux, who died this year at a ripe old age of natural causes and was one of my Cornell mentors who taught me about the importance of societal influences on human behavior. I thank my students and former students, represented here by Matthew Chinman and Pam Imm, who so graciously introduced me, for their intelligent and idealistic efforts in our collaborative work.

Writing this paper was a journey of the heart and head. In this journey I was directly aided and abetted by many. This paper was immeasurably improved because of feedback from Shawn Coyne, Paul Flaspohler, Larry Green, Jim Kelly, Susan Labin, Roger Mitchell, Sarah Morsbach, Rick Price, Chris Ringwalt, Seymour Sarason, Beth Shinn, and Lois Pall Wandersman.

REFERENCES

Backer, T. (2001). *Finding the balance: Program fidelity and adaptation in substance abuse prevention*. Rockville, MD: Center for Substance Abuse Prevention.

Backer, T. (2002). *Evaluating community collaborations for serving youth at risk: A handbook for mental health, school and youth violence prevention organizations.* Rockville, MD: Center for Mental Health Services.

Backer, T., David, S., & Soucy, G. (Eds.). (1995). *Reviewing the behavioral science knowledge base on technology transfer*. Washington, DC: National Institute of Drug Abuse.

Botvin, G. J., Baker, E., Dusenbury, L., Botvin, E. M., & Diaz, T. (1995). Long-term follow-up results of a randomized drug abuse prevention trial in a white middle-class population. *JAMA*, *273*(14), 1106–1112.

Bronfenbrenner, U. (1979). *The ecology of human development: Experiments by nature and design.* Cambridge, MA: Harvard University Press.

Cates, W. (1995). Prevention science: The umbrella discipline. *American Journal of Preventive Medicine*, *11*(4), 211–212.

Churchman, A. (1987). Can resident participation in neighborhood rehabilitation programs succeed: Israel's Project Renewal through a comparative perspective. In I. Altman, & A. Wandersman (Eds.), *Neighborhood and community environments* (pp. 113–162). New York: Plenum.

Compton, D., Baizerman, M., & Stockdill, S. (2002). The art, craft, and science of evaluation capacity building. *New Directions for Evaluation*, *93*. **Q6**

Connell, J. P., Kubisch, A. C., Schorr, L. B., & Weiss, C. H. (Eds.). (1995). *New approaches to evaluating community initiatives* (Vol. 1). Washington, DC: The Aspen Institute.

Cousins, B., & Earl, L. (1992). The case for participatory evaluation. *Educational Evaluation and Policy Analysis*, *14,* 397–418.

Dalton, Elias, & Wandersman (2001). *Community psychology: Linking individuals and communities.* Belmont, CA: Wadsworth. **Q7**

Dryfoos, J. (1990). *Adolescents at risk: Prevalence and prevention*. New York: Oxford University Press.

Eliot, D. (Ed.). (1998). *Blueprints for violence prevention.* Boulder: University of Colorado, Center for the Study and Prevention of Violence.

Enett, S. T., Tobler, N. S., Ringwalt, C. L., & Fewlling, R. L. (1994). How effective is drug abuse resistance education? A meta-analysis of Project DARE outcome evaluations. *American Journal of Public Health*, *84,* 1394–1401.

Fetterman, D. (2001). *Foundations of empowerment evaluation*. Thousand Oaks, CA: Sage.

Fetterman, D., Kaftarian, S., & Wandersman, A. (Eds.). (1996). *Empowerment evaluation: Knowledge and tools for self-assessment and accountability.* Thousand Oaks, CA: Sage.

Feuer, M. J., Towne, L., & Shavelson, R. (2002). Scientific culture and educational research. *Educational Researcher*, *31*(8), 4–14.

Florin, Chavis, Rich, & Wandersman (1992). A systems approach to understanding and enhancing grassroots organizations: The Block Booster Project. In R. Levine & H. Fitzgerald (Eds.), *Analysis of dynamic psychological systems: Methods and applications* (Vol. 2, pp. 215–243). New York: Plenum. **Q8**

Francisco, V., Schultz, & Fawcett, S. (2002). How to make sense of results from collaorbation evaluations. In T. Backer (Ed.), *Evaluating community collaborations for serving youth at risk: A handbook for mental health, school and youth violence prevention organizations.* Rockville, MD: Center for Mental Health Services. **Q9**

General Accounting Office. (2003, January 15). *Youth illicit drug use prevention: DARE long-term evaluations and federal efforts to identify effective programs* (GAO-03-172R).

Green, (2001). From research to "best practices" in other settings and populations. *American Journal of Health Behavior*, *25*(3), 165–178. **Q10**

Green, L. W., & Kreuter, M. (1999). *Health promotion planning: An educational and ecological approach* (3rd ed.). Mountain View, CA: Mayfield.

Green, L. W., & Kreuter, M. (2002). Fighting back or fighting themselves?: Community Coalitions against substance abuse and their use of best practices. *American Journal of Preventive Medicine*, *23*(4), 303–306. **Q11**

Green, L. W., & Mercer, S. I. (2001). Community-based participatory research: Can public health researchers and agencies reconcile the push from funding bodies and the pull from communities.? *American Journal of Public Health*, *91*(12), 1926–1929.

Hallfors, D., Cho, H., Livert, D., & Kadushin, C. (2002). Fighting back against substance abuse: Are community coalitions winning? *American Journal of Preventive Medicine*, *23*(4), 237–245.

Handel, M. J. (2002, Summer). *The sociology of organizations: Classic, contemporary, and critical readings*. Thousand Oaks, CA: Sage.

Havelock, R. G. (1971). *Planning for innovation through dissemination and utilization of knowledge*. Ann Arbor: University of Michigan, Institute for Social Research.

Heller, K., Price, R., Riger, S., Reinharz, S., & Wandersman, A. (1984). *Psychology and community change* (2nd edn.). Homewood, IL: Dorsey.

Jason, L. A., Keys, C. B., Suarez-Balcazar, Y., Taylor, R. R., Davis, M., Durlak, J., et al. (Eds.) (xxxx). Participatory community research: Theories and methods in action. Manuscript in preparation.

Johnston, L. D., O'Malley, P. M., & Bachman, J. G. (2003). *Monitoring the future results on adolescent drug use: Overview of key findings, 2002.* (503 pp.) Bethesda, MD: National Institute on Drug Abuse.

Kalleberg, A., Knoke, D., Marsden, P. V., & Spaeth, J. L. (Eds). (1996). *Organizations in America: Analyzing their structures and human resource practices.* Thousand Oaks, CA: Sage.

Katz, & Kahn (1978). *The social psychology of organizations.* New York: Wiley.

Kingry-Westergaard, C., & Kelly, J. C. (1990). A contextualist epistemology for ecological Research. In P. Tolan, C. Keys, F. Chertok, & L. Jason (Eds.), *Researching community psychology* (pp. 23–32). Washington, DC: American Psychological Association.

Kreuter, M. W., Lezin, N. A., & Young, L. A. (2000). Evaluating community-based collaborative mechanisms: Implications for practitioners. *Health Promotion Practice*, *1*(1), 49–63.

Lancaster, B. (1992). Closing the gap between research and practice. *Health Education Quarterly*, *19,* 408–411

Mitchell, R., Florin, P., & Stevenson, J. (2002). Supporting community-based prevention and health promotion initiatives: Developing effective technical assistance systems. *Health Education and Behavior*, *29*(5), 620–639.

Morrissey, E., Wandersman, A., Seybolt, D., Nation, M., Crusto, C., & Davino, K. (1997). Toward a framework for bridging the gap between science and practice in prevention: A focus on evaluator and practitioner perspectives. *Evaluation and Program Planning*, *20*(3), 367–377.

Mrazek, P., & Haggerty, R. (Eds.). (1994). *Reducing risks for mental disorders*. Washington, DC: National Academy Press.

Nathan, P. (2002). *Implications of evidence-based practice for public policy*. Paper presented at the American Psychological Association annual conference in Chicago. (2002, February 4) *Newsweek*, p. 48.

NIMH website. (1996). *A framework for modern prevention science* (chap. 2, p. 1).

Price, R. H., & Behrens, T. (2003). Working pasteur's Quardant: Harnessing Science and Action for Community Change. *American Journal of Community Psychology*, *31*(314), xx–xx.

Price, R. H., Friedland, D. S., Choi, J. N., & Caplan, R. D. (1998). Job loss and work transitions in a time of global economic change. In X. B. Arriaga and S. Oskamp (Eds.), *Addressing community problems: Research and intervention* (pp. 195–222). Thousand Oaks, CA: Sage.

Ringwalt, C. L., Ennett, S., Vincus, A., Thorne, J., Rohrbach, L. A., Simons-Rudolph, A. (2002). The prevalence of effective substance use prevention curricula in U.S. middle schools. *Prevention Science*, *3,* 257–265.

Schorr, L. (1997). *COMMON PURPOSE: Strengthening families and neighborhoods*. New York: Doubleday.

Tandon, S. D., Azelton, L. S., Kelly, J. G., & Strickland, D. A. (1998). Constructing a tree for community leaders: Contexts and processes in collaborative inquiry. *American Journal of Community Psychology*, *26,* 699–696.

Tandon, S. D., Kelly, J. G., & Mock, L. O. (in press). Participatory action research as a resource for developing African-American community leadership. In D. L., Tolman & M. Brydon-Miller (Ed.), *Transforming psychology: Interpretive and participatory research methods.* New York: New York University Press.

U.S. Preventive Services Task Force. (1996). *Guide to clinical preventive services* (2nd edn). Alexandria, VA: International Medical Publishing.

Wandersman, A. (1999). Framing the evaluation of health and human service programs in community settings: Assessing progress. *New Directions for Evaluation*, *83,* 95–102.

Wandersman, A., Chavis, D., & Stucky, P. (1983). Involving citizens in research. In R. Kidd & M. Saks (Eds.), *Advances in applied social psychology* (Vol. 2). Hillsdale, NJ: Erlbaum.

Wandersman, A., & Florin, P. (2000) Citizen participation and community organizations. In J. Rappaport & E. Seidman (Eds.), *Handbook of community psychology*. New York: Plenum.

Wandersman, A., & Florin, P. (in press). Community interventions and effective prevention. *American Psychologist.*

Wandersman, A., Imm, P., Chinman, M., & Kaftarian, S. (1999). *Getting to outcomes: Methods and tools for planning, evaluation and accountability.* Rockville, MD: Center for Substance Abuse Prevention.

Wandersman, A., Imm, P., Chinman, M., & Kaftarian, S. (2000). Getting to outcomes: A results-based approach to accountability. *Evaluation and Program Planning*, *23,* 389–395.

Wandersman, A., Keener, D. C., Snell-Johns, J., Miller, R., Flaspohler, P., Dye, M., et al. (xxxx). *Empowerment evaluation Principles and Action*. In L. A. Jason, C. B. Keys, Y. Suarez-Balcazar, R. R. Taylor, M. Davis, J. Durlak, & D. Isenberg (Eds.), *Participatory community research: Theories and methods in action*. Manuscript submitted for publication.

Yost, J., & Wandersman, A. (2000). Results-oriented grantmaking. In W. K. Kellogg Foundation (Ed.), *Empowerment evaluation and foundations: A matter of perspectives*. Battle Creek, MI.

Zhang, X., & Wandersman, A. (2002). *Web-based IT system for outcome-based prevention.* Funded by the National Institute on Drug Abuse.

Author's queries:

Q1: Au: Kindly include this reference in the reference list.
Q2: Au: Kindly provide the missing page no.
Q3: Au: Kindly check this sentence in the extract. It does not seem to be complete.
Q4: Au: Kindly specify whether this text citation refers to two different references or a singe reference. Also, include this reference in the reference list or delete the text citation.
Q5: Au: Kindly note that the year in the text citation has been changed to 2000 as per the reference list. Is it OK?
Q6: Au: Kindly provide additional information required by the reader to locate the reference.
Q7: Au: Kindly provide the initials of the authors in this reference.
Q8: Au: See Q7.
Q9: Au: Kinldy provide the initials of the second author "Schultz." Also provide the page range for this reference.
Q10: Au: See Q7.
Q11: Au: Note that this reference has not been cited in the text. Kindly cite this reference in the text or delete it from the reference list.
Q12: Au: Kinldy provide the year of the draft for this reference.
Q13: Au: See Q7
Q14: Au: Kindly provide the article title.
Q15: Au: Kindly update this reference, if possible.
Q16: Au: Kindly provide the page range for this reference.
Q17: Au: Kindly update this reference, if possible.
Q18: Au: Kindly provide the year of the draft for this reference.
Q19: Au: Kindly provide the publisher name for this reference.