

Developing a Community Science Research Agenda for Building Community Capacity for Effective Preventive Interventions

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Research has shown that prevention programming can improve community health when implemented well. There are examples of successful prevention in local communities, however many continue to face significant challenges, demonstrating a gap between science and practice. Common strategies within the United States to address this gap are available (e.g., trainings), but lack outcomes. Building community capacity to implement high quality prevention can help communities achieve positive health outcomes, thereby narrowing the gap. While there is ample research on the efficacy of evidence-based programs, there is little on how to improve community capacity to improve prevention quality. In order to narrow the gap, a new model of research—one based in Community Science—is suggested that improves the latest theoretical understanding of community capacity and evaluates technologies designed to enhance it. In this article, we describe this model and suggest a research agenda that can lead to improved outcomes at the local level.

KEY WORDS: capacity; technical assistance; prevention.

Prevention programming (e.g., substance abuse prevention) improves community health (CDC, 2002; NIDA, 1997) when implemented well (Backer, 2001). To further that end, increasing attention has been paid to “evidence-based” interventions—interventions that yield positive results under research conditions—hypothesizing that these programs will result in outcomes at the local level similar to those achieved under the research conditions where they were developed. While many of these programs have produced positive outcomes, the record at the local level “practice” has been

mixed (Wandersman & Florin, 2003). It is perhaps because the exclusive focus on testing and disseminating these programs misses the important role of the community and its capacity to deliver them. For example, what guidance is available for community-based organizations faced with school systems that will not provide the time, space, or staff necessary to achieve the outcomes expected? Given that issues such as these are not typically the focus in efficacy trials, there needs to be an additional research emphasis on other factors that challenge communities. While these factors are many (e.g., political climate, available funding), this article focuses on the role of *community capacity* and develops a model for studying community capacity and its relationship to prevention practice and outcomes. The goal of this inquiry is to develop methods and tools for improving community capacity as a mechanism for increasing community prevention outcomes. In this article, we tend to focus on substance abuse prevention to illustrate our review and our model; however, issues of

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community capacity and how to improve it are relevant across many prevention domains.

First we will discuss the discrepancy between outcomes achieved at the local level and through prevention science. Second we discuss how that apparent “gap” may be better conceptualized as an issue of community capacity and that its study at the local level is an example of Community Science. Third, to better understand community capacity, we review the relevant literature, exploring its connections to prevention practice and outcomes. Fourth, we turn to discussing current applications of community capacity building technologies and their limitations. Fifth, this is followed by a definition and literature review for one specific application that has shown potential in building community capacity—technical assistance. Sixth, using the literature on community capacity and a promising community capacity building technology (i.e., technical assistance), we then suggest a research model and agenda, rooted in Community Science, for studying community capacity and technical assistance as a way to improve it. We conclude with a description of our ongoing research project on a community capacity building process—Getting To Outcomes—as an example of the research agenda that we propose.

A GAP BETWEEN SCIENCE AND PRACTICE

Despite examples of successful prevention in local settings (e.g., see Shinn and Miller, 2005), many communities continue to face significant challenges, particularly in substance abuse prevention (Altman, 1995; Backer, 2000; Morrissey et al., 1997; Mrazek & Haggerty, 1994; Wandersman & Florin, 2003). It has been suggested that communities could obtain more consistent positive outcomes if we could bridge this gap between “science” and “practice.” Common strategies within the United States are available, such as providing materials and trainings about evidence-based programs, but there is relatively little evidence available about the effectiveness of these strategies (Ennett et al., 2003). We contend that these approaches—mostly based on the theory that local practitioners lack the necessary information—have not been successful in large part because they are too narrow in scope. In contrast, conceptualizing the difficulty in achieving positive outcomes at the local level as one of community capacity may better reflect the varying levels of complexity involved and spark better research and more effective solutions. The study of community capacity is an exam-

ple of Community Science, a multidisciplinary field that attempts to strengthen community functioning by investigating how to improve the quality of common approaches (prevention, treatment, education, health promotion) implemented in real world settings (Wandersman, 2003). Community Science is well suited to address the gap because it specifically *starts* with prevention practice, developing and testing community-centered models.

There are several factors that contribute to the gap between science and practice. First, implementing high quality prevention programming is a complex process, and requires a significant amount of knowledge and skills. There are many factors and steps that need to be addressed (e.g., conducting needs assessments; setting goals and objectives; choosing appropriate programming that fits the local context given current resources; planning, implementing, evaluating, and sustaining programs), each representing a point in which the prevention process can falter, contributing to poor outcomes (Chinman et al., 2001; Wandersman, Imm, Chinman, & Kaftarian, 2000). Second, systems-level factors such as key differences between researchers and practitioners in their theoretical orientations and training, lack of coordination among different agencies and systems, and a lack of community readiness to adopt and maintain evidence-based strategies can impede quality prevention efforts. Third, a lack of resources: both financial (in part brought on by short-term funding priorities) and technical, such as a lack of access to the scientific literature are barriers to the adoption and implementation of proven programs and policies (Morrissey et al., 1997). Finally, local practitioners face the challenge of adapting prevention programs to their own setting, which is often complicated by both the lack of attention to dissemination issues by many program developers (Schoenwald & Hoagwood, 2001) and by attempts to implement “best practices” without consideration of the external validity, or generalizability, of that practice to the local setting (Green, 2001). As will be shown in the following section, many of these factors such as skills, resources, and power to affect larger systems issues can be conceptualized as community capacity. Wandersman & Florin (2003) conclude that to significantly improve the quality of community-based prevention and address the gap between science and practice, attention needs to be paid to capacity of local prevention practitioners. Therefore, a better understanding of community capacity and methods for its improvement will

directly facilitate the narrowing of the gap between science and practice and improve prevention outcomes.

LITERATURE REVIEW OF COMMUNITY CAPACITY

Community capacity has been defined in a variety of ways. Some of the earliest work used the term, “competent community,” first defined by Cottrell (1976) based on his own observation and practical experience as: (1) community participation in defining and reaching goals, (2) commitment, (3) community understanding of its own and others’ issues, (4) articulateness of the community in expressing its needs, (5) effectiveness in communicating information and achieving consensus within a community, (6) conflict management, (7) management of relations within the community including the use of outside resources, and (8) representative decision-making. Iscoe stated in his 1972 Division 27 presidential address that competent communities exhibited the ability to acquire and use resources to address any problem facing them (Iscoe, 1974). In their definition of capacity to conduct health promotion activities, Stokols, Grzywacz, McMahan, and Phillips (2003) also focused on the acquisition and use of resources including (1) mobilization of existing resources, (2) enlargement and diversification of those resources, and (3) empowerment of community members to sustain health improvement efforts, which indicates a true mastery over local health problems.

In addition to resources, many definitions of community capacity refer to skills that organizations or communities must possess in order to be effective in creating change. For example, Mayer’s Rainbow Research Organization works with programs that build capacity, which they conceptualize as the . . . “sum total of commitment, resources, and skills that a community can mobilize and deploy to address community problems and strengthen community assets (Mayer, 1996).” The Aspen Institute later incorporated this three-part definition into their workbook designed to help rural communities measure community capacity (Aspen Institute, 1996). In defining the capacity of non-profit community-based development organizations, Frederickson and London (2000) place a similar emphasis on skills and resources including leadership and vision (includes genuine community participation), formalized man-

agement and planning practices, fiscal planning and practice, and operational support (e.g., staffing adequacy, turnover, physical infrastructure and technical resources).

Funders have also started to define community capacity as a result of incorporating this activity into their core mission. For example, the Colorado Trust, a foundation designed to promote the health of Colorado citizens started in 1985, has identified the following community capacity elements as critical: (1) skills and knowledge, (2) leadership that exploits local talents, (3) a sense of efficacy and confidence, (4) social capital, and (5) a culture that fosters continuous improvement (Easterling, Gallagher, Drisko, & Johnson, 1998).

One of the most comprehensive definitions of community capacity was the result of a CDC-sponsored conference in which several experts came to a consensus through an iterative process of discussion and consideration of the current literature (Goodman et al., 1998). Attempting to distinguish community capacity from other similar constructs, they stated that “community empowerment” was a *part of* community capacity and “competent communities” was the skillful application of the potential *contained in* community capacity. Starting with two definitions that emphasized skills in identifying, mobilizing, and addressing social and public health problems, the participants developed a multifaceted definition of community capacity that includes: (1) citizen participation, (2) leadership, (3) skills, (4) resources, (5) social and inter-organizational networks, (6) sense of community, (7) community history, (8) community power, (9) community values, and (10) critical reflection.

Others have postulated different levels of community capacity based on the reach of the particular community or organization. Hawe Noort, King, and Jordens (1997) call the bottom level “health infrastructure or service development,” representing the minimum level of structure, skills, and resources needed to address a specific health problem similar to what was discussed above. The middle level, or “program maintenance or sustainability” is achieved when an organization or community can access new networks to deliver their programs. Finally, when organizations or communities develop a generic capacity to identify and address new health problems, based on their work with the original health problem, they are demonstrating the highest level of community capacity, “problem-solving capability.”

Community Capacity Literature Summary

Looking across the various definitions, certain core dimensions of community capacity are evident. First, most definitions stress the importance of *community* with greater capacity associated with more genuine member involvement (e.g., setting goals) and bonding both to the community (e.g., commitment) and among its members (e.g., social capital, sense of community). Second, almost all the definitions stressed the importance of *skills* possessed by the community or organization, that relate either to the skills needed to run an effective community organization itself (formalized management and planning practices, communication, conflict management) or the steps required to implement specific health promotion programming with quality (conducting needs assessments; setting goals and objectives; choosing appropriate programming that fits the local context given current resources; planning, implementing, evaluating, and sustaining programs). Third, all definitions stated that a key element of community capacity involved *resources*, including identifying and mobilizing existing resources and acquiring and managing newly acquired resources. These resources were broadly conceived, encompassing funding, quality staffing, computer hardware and software, and physical space. Fourth, some of the definitions stated that *power*, characterized as empowerment or collective efficacy, were important aspects of community capacity in terms of the ability to effectively channel the skills and resources toward a health improvement goal.

In addition to the content of the capacity dimensions, the definitions of community capacity are conceptualized at different levels and have varying goals. For example, communities, organizations, or individuals have all been discussed as possessing varying levels of capacity. Also, capacity for action needed to address any health problem (“generic capacity”) by any means required (e.g., treatment, prevention, interdiction) has been distinguished from the community capacity needed to carry out all the steps of high quality prevention, although presumably the two overlap to a large extent.

Community Capacity Literature: Relationship to Prevention Practice and Outcomes

While there has been research that empirically links elements of community capacity to population

level outcomes, such as the link between social capital and mortality rates (Kawachi, Kennedy, Lochner, & Prothrow-Stith, 1997), cooperative social networks and low-birth weight (Roberts, 1997), and collective efficacy and the rate of violent crime (Sampson, Raudenbush, & Earls, 1997), there is not this type of work in the field of substance abuse prevention. What has been done in the prevention field is to examine the relationship between specific elements of community capacity as defined above and specifically, the *implementation* of prevention. For example, a small number of studies have shown that factors at both the individual level (e.g., training, skills, efficacy, involvement in decision making, and satisfaction of teachers) and at the organizational level (organization size, climate, and financial resources, and active support of principals and administrators,) all have been shown to predict successful implementation of prevention in public schools (Ennett et al., 2003; McCormick, Steckler, & McLeroy, 1995; Parcel et al., 1989; Rohrbach, Graham, & Hansen, 1993; Rohrbach, D’Onofrio, Backer, & Montgomery, 1996; Steckler, Goodman, McLeroy, Davis, & Koch, 1992). While these studies have yielded important findings, their focus was limited to mostly the adoption and implementation of specific evidence-based programs. However, to be more successful, communities need to have capacity to perform a wider range of prevention activities such as conducting needs assessments; setting goals and objectives; choosing appropriate programming that fits the local context given current resources; planning, evaluating, and sustaining programming.

It is helpful to note that there is now a developing literature on the links between *organizational* capacity elements and specific prevention practices (Livet & Wandersman, 2005). While organizational and community capacity are not equivalent, this literature does offer suggestions for relationships to explore in further research. The Livet and Wandersman review included 68 empirical studies across a wide range of fields (e.g., substance abuse, domestic violence and child abuse, family planning, mental health, HIV/AIDS, cardiovascular and reproductive health, and other health care services) and found many examples of organizational capacity elements being related to specific prevention practices. For example, the resource of adequate time was significantly related to conducting needs assessments, choosing appropriate programs, and planning and sustaining programs. The connection to local community was significantly related to conducting needs

assessments, choosing appropriate programs, ensuring programs fit the local context, and planning, implementing, and sustaining programs. Staff skills were related to all prevention practices except evaluation. Finally, the presence of a program champion, an aspect of power, was associated with conducting needs assessments and sustainability. Although this review mostly included case studies with convenience samples (only one study was a randomized controlled trial) and many were not in the substance abuse prevention field, it did begin to show how resource capacity and prevention practices could be related.

COMMUNITY CAPACITY BUILDING TECHNOLOGIES

While gaining a better understanding of community capacity is a necessary first step, the next step is to build community capacity in order to increase the likelihood of reaching positive outcomes. Below we review some community capacity building technologies that are currently being employed and consider their limitations.

Technology Transfer and Training

Most current strategies for enhancing community capacity use the technology transfer approach (Backer, David, & Soucy, 1995), which views the lack of community capacity as reflecting a lack of information. One example is prevention training offered by a wide array of national (e.g., Center for Substance Abuse Prevention [CSAP]'s five regional Centers for the Application of Prevention Technology), state, and local entities. To support these trainings, the International Certification and Reciprocity Consortium for Alcohol and Other Drug Abuse (IC&RC) accredits prevention professionals in 40 states and the District of Columbia by requiring ongoing training (Tebes, Kaufman, & Chinman, 2002). Another example has been to broadly disseminate information about programs shown to be effective (CSAP's model programs: <http://modelprograms.samhsa.gov/template.cfm>) and the guidelines or best practice principles that research has shown to be associated with high quality prevention (e.g., National Institute on Drug Abuse [NIDA]'s revised "Redbook," Robertson, David, & Rao, 2003; CSAP's principles, Schinke, Brounstein, & Gardner, 2002). Increasingly, federal agencies (CSAP, NIDA, Office of National Drug Control

Policy or ONDCP), state alcohol and drug agencies, and university researchers have all used the Internet to disseminate this information.

While these efforts are helpful, they have serious limitations. For example, the appropriateness of the content of trainings is unclear (e.g., prevention theory and science are not required for IC&RC certification; Tebes et al., 2002) and training attendees typically experience significant barriers to incorporating newly learned information into their work (Cividin & Ottoson, 1997; Ottoson, 1997). The various mechanisms used to disseminate evidence-based programs have yet to make the majority of prevention programs implemented in the United States truly evidence-based (e.g., Ennett et al., 2003; Ringwalt et al., 2002). While the Internet is useful, the amount of information available on these sites is enormous, requiring considerable time to locate the desired information. Perhaps better suited for experienced practitioners, those with less experience are likely to be overwhelmed and unable to effectively utilize these resources. Finally, these technology transfer approaches do not engage local communities to find out what would work best in their particular settings. For example, a community attempting to implement a school-based program in a non-supportive school district may get better results from capacity building assistance to improve program choice and fit than more information about the school-based program.

Technical Assistance

Technical assistance is defined as an "intermediary support" (Mitchell, Florin, & Stevenson, 2002, p. 623) or direct, hands-on aid that builds capacity within communities to complete with quality any of the various tasks involved in prevention. Among other factors, technical assistance can vary according to where it is located (government, private, university), how centralized it is, or by its personnel (permanent staff, contractors convened as needed) (Mitchell et al., 2002). Several authors have acknowledged the potential benefit of technical assistance. Wandersman and Florin (2003) state that it would be an effective means for improving community capacity for prevention, thereby narrowing the gap between science and practice and increasing the likelihood of achieving positive outcomes (Wandersman & Florin, 2003). Backer (1991) places great emphasis on interpersonal contact and outside consultation

in developing strategies for innovation diffusion (e.g., use of new evidence-based programs). Altman (1995) states that ongoing relationships between researchers and communities are needed for sustained interventions. Butterfoss, Morrow, Webster, and Crews (2003) showed that even after intensive training, immunization coalition members wanted further hands-on technical assistance.

Despite technical assistance's potential benefits and widespread use by federal agencies (Center for Substance Abuse Prevention, <http://prevention.samhsa.gov/>) and national non-profits (Community Anti-Drug Coalitions of America, www.cadca.org), the empirical work on its effectiveness on community capacity and health outcomes has been limited. Mitchell, Stone-Wiggins, Stevenson, and Florin's (2004) evaluation of 41 community coalitions in Maine that addressed substance abuse and other behavioral health problems found that those who used the available technical assistance services (only a third of the coalitions at any one time) rated these services positively, but use of technical assistance was not associated with improved collaboration or community impacts. The authors concluded that coalitions require some initial capacity, for example to understand their own strengths and weaknesses, in order to utilize technical assistance.

In a more targeted effort to improve capacity to conduct evaluation, a key aspect of conducting successful prevention (Chinman et al., 2001; Wandersman, Imm, Chinman, & Kaftarian, 2000), Stevenson, Florin, Mills, and Andrade (2002) analyzed the impact of the extensive technical assistance they provided to 13 community-based organizations in Rhode Island. Over 3 years, most organizations completed most evaluation steps, especially those that involved organizational resources, planning, and utilization of data, while few improved on data collection and analysis tasks. Hours of technical assistance utilized were highly correlated with the number of evaluation steps completed. Interest in receiving the technical assistance and organizational stability were cited as significant challenges. Other descriptions of technical assistance in substance abuse prevention include Fawcett et al.'s (1995) community empowerment model used to replicate Project Freedom in three Kansas communities. The model consisted of assistance with needs assessments, organizational structure, recruitment methods, a mini-grant program, and coalition monitoring. The authors provide anecdotal evidence of improved capacity, but concede that the model remains largely untested.

Given the CDC's large commitment to providing technical assistance to community-based organizations involved in HIV prevention (Davis et al., 2000), there have been some efforts to study this technical assistance explicitly. O'Donnell et al. (2000) assisted five community health agencies in Massachusetts and Connecticut to replicate a brief educational HIV intervention through training sessions, implementation manuals and materials, and 2–4 hr of technical assistance per month starting with a detailed assessment of the agencies' existing capacity. Staff interviews, observations, and a technical assistance log showed that technical assistance centered around: administrative support, target population, recruitment, fidelity, tailoring, implementation skills and challenges, and incorporating the intervention into existing services. Technical assistance was successful at tailoring the intervention into the local setting and improving fidelity, orienting new staff, and bolstering staff effort and motivation. Challenges for the technical assistance providers were the tension between the project staff's interest in fidelity versus the agency staff's desire for adaptation, the initial skill levels of staff, staff turnover, and the worsening implementation fidelity after the reduction of the technical assistance. Gibbs, Napp, Jolly, Westover, and Uhl (2002) interviewed community-based organizations, health departments, and technical assistance providers about evaluation capacity within the context of HIV prevention and proposed a three stage model of technical assistance (compliance, investment, and advancement), prescribing certain technical assistance actions be taken based on the initial motivation and skill level of the organization.

There have been a few efforts to assess the effectiveness of technical assistance in health promotion. For example, Miller, Bedney, and Guenther-Grey (2003) created the Feasibility, Evaluation Ability, and Sustainability Assessment (FEASA) to assess the results of their "array of capacity-building activities (grant writing, program development, management, and evaluation, adolescent development and cultural competence)" undertaken in 13 communities as part of their evaluation of the HIV prevention intervention trial called Community Intervention Trial for Youth (CITY) project. Using a mix of mostly qualitative methods (interviews, records, observations), the measure focuses on mission/leadership and board development, program development, evaluation and management, fiscal skills (e.g., grant writing), human resources management

(especially volunteers), and access to information. The instrument was not used as an evaluation tool, but as a needs assessment, which helped the authors better understand the capacity of the organizations in which they were working and to better integrate their HIV intervention. Eng and Parker (1994) evaluated the community competence component of a Partner for Improved Nutrition and Health Project (PINAH) in the Mississippi Delta. PINAH staff recruited and trained 52 natural helpers to be community health advisors (CHAs) and via monthly meetings, provided the CHAs with technical assistance in outreach, planning, implementation, and evaluation in order to mobilize local residents and undertake community-based efforts to address local health problems. Starting with the dimensions proposed by Cottrell (1976) described in the capacity literature review earlier, Eng and Parker (1994) created a survey operationalizing each of the Cottrell dimensions as scales. Among the 45 key informants surveyed (representing three communities), they found improvements after 1 year in the degree to which communities were able to work with external institutions and local officials.

While research on technical assistance is still in its infancy, the above studies offer critical first lessons about the effectiveness of technical assistance to improve community capacity. First, although it seems that the availability of no-cost technical assistance would be universally welcomed, this is not always the case. Second, there is some evidence to suggest that utilization of technical assistance itself requires a minimum level of community capacity. Third, it appears that community-based organizations are better able to improve, as a result of technical assistance, on tasks that involve planning, implementation, and organizational maintenance, whereas tasks such as data analysis remain difficult to develop. Feinberg, Greenberg, Osgood, Anderson, and Babinski (2002) found a similar result after training 21 substance abuse prevention coalitions in Pennsylvania. Whether this is because data analysis is more complicated or just less in the usual workflow and domain of practitioners is unclear. Fourth, given the methodological challenges, to date, technical assistance has not been empirically linked to improved health outcomes; instead these studies have assessed its impact on various community capacity elements and perceived community impacts. Finally, the technical assistance literature tends to be pragmatic in how it approaches community capacity building, mostly drawing upon practical experiences and lessons

learned. This is not surprising given the early stage of this research. More research is needed that not only incorporates a theoretical framework for the technical assistance activities, but also clarifies its impact on health outcomes in addition to community capacity.

A COMMUNITY SCIENCE RESEARCH MODEL OF COMMUNITY CAPACITY FOR PREVENTIVE INTERVENTIONS

Figure 1 illustrates a research model that hypothesizes connections between capacity building technologies such as technical assistance, community capacity, prevention practices, and outcomes. This model is an example of Community Science because it focuses on capacity at the local level as a starting point, attempting to better understand its relationships to prevention practices and health outcomes, and how to enhance it. This model has a basis in other established fields, namely traditional healthcare services research. Donabedian's structure-process-outcome research model (Donabedian, 1966, 1980), arguably the most dominant model for the assessment of healthcare quality (Frenk, 2000), states that *structure* is the characteristics of the service system, *process* is the practice of the service delivery, and *outcomes* are changes in health status. They are linked, with structural characteristics influencing the quality of the care process, which in turn influences health status. The Donabedian model parallels the one presented here: community capacity (structure) influencing prevention practice (process of care) leading to outcomes. Quality improvement strategies (in healthcare services research terminology) are similar to capacity building technologies.

The total model prescribes that first; all aspects of community capacity building interventions (e.g., technical assistance) should be closely monitored—e.g., through process evaluation—and its relationship to improvements in the various community capacity elements (across different levels) examined. Then, the relationship between the specific changes in those community capacity elements and the changes in actual prevention practices (e.g., conducting needs assessments; setting goals and objectives; choosing appropriate programming that fits the local context given current resources; planning, implementing, and evaluating programs; and sustaining them) would be assessed. Finally, assessing change in health outcomes due to changes in those prevention practices would be the final step. The model could also be

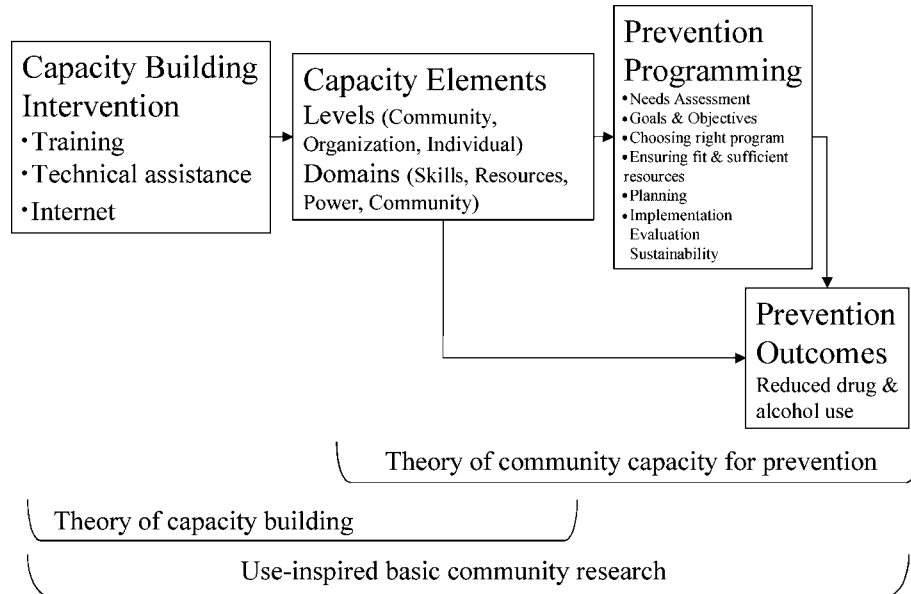


Fig. 1. A community science research model of community capacity for preventive interventions.

divided so that separate studies could assess (1) the link between change technologies (e.g., technical assistance) and community capacity and (2) the relationship between the improvement in certain community capacity elements and prevention practices or outcomes.

A COMMUNITY SCIENCE RESEARCH AGENDA OF COMMUNITY CAPACITY FOR PREVENTIVE INTERVENTIONS

Based on the above model, we now turn to developing a Community Science research agenda of community capacity and how to improve it through technical assistance. Table I presents a summary of the agenda. As a way to structure the research agenda, we adopt the framework described by Price and Behrens (2003)—“Pasteur’s Quadrant” (Stokes, 1997). The figure shows that traditionally, research tends to *either* pursue improved theoretical understanding *or* evaluate applied change technologies, but that both can be accomplished simultaneously through “use-inspired basic community research” (Fig. 2). The top two quadrants in Fig. 2 depict basic social research, moving existing theoretical understanding (Quadrant 1) towards improved theoretical understanding (Quadrant 2); and the bottom two quadrants involve purely applied research and devel-

opment, moving existing change technology towards improved change technology (Quadrant 4). Use-inspired basic community research is at the intersection of these two rows, increasing understanding of basic processes while evaluating the effectiveness of practical change technologies (e.g., Pasteur discovered “germs” while evaluating ways to prevent food spoilage). Therefore by incorporating theory, this type of research is broader than other related approaches such as program evaluation and applied research that can be atheoretical and whose primary goal is to find out if something worked. Use-inspired basic community research is similar to “action research” (Marrow, 1969) in that it involves testing theories and approaches in real settings, but the Pasteur’s Quadrant model makes it more clear how both applied and theoretical research can combine in community settings. We contend that theoretical, applied, or use-inspired basic community research on community capacity and technical assistance in local settings would serve to narrow the gap between science and practice and are useful examples of Community Science.

Theoretical Study of Community Capacity

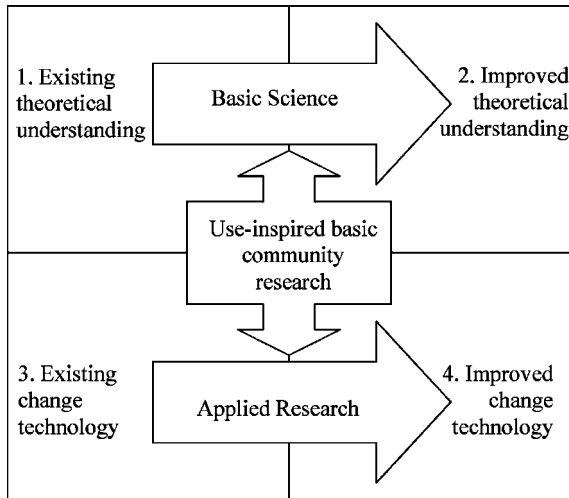
Row 1 of Table I lists research questions involving the relationship between the elements of

Table I. A Community Science Research Agenda of Community Capacity for Preventive Interventions

| | General approach | Example research questions |
|------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. Basic science | <p>Examining the relationship between:</p> <ul style="list-style-type: none"> • Capacity and prevention intervention quality • Capacity and outcomes directly | <p>What is the relationship between specific elements of capacity (community, skills, resources, power) and specific prevention practices (e.g., planning, implementation, evaluation)?</p> <ul style="list-style-type: none"> • How strong are these relationships? <p>• How do these relationships operate in different populations, settings, and communities?</p> <p>What is the lag time between a change in capacity and its subsequent change in prevention practices?</p> <p>How does capacity at an individual level affect the prevention practices of an organization like a community coalition?</p> <p>What are the relationships directly between elements of capacity and community outcomes?</p> <p>What is the relationship between generic capacity and the capacity to conduct all the practices associated with high quality prevention?</p> <p>How well does diffusion of innovation theory predict utilization of technical assistance?</p> |
| 2. Use-inspired basic community research | <p>Examining the impact of a capacity building intervention (e.g., technical assistance) as a way to better understand capacity itself</p> | <p>Which technical assistance interventions would most help practitioners in utilizing model programs effectively to achieve previously demonstrated results?</p> <p>Which health outcomes are most amenable to change through technical assistance interventions?</p> <p>Which CSAP best practice capacity building processes are best for different prevention practices, health outcomes, and settings?</p> <p>What are the relative benefits to level of capacity, prevention practices, and health outcomes of using technical assistance to improve generic capacity versus improving the capacity to implement a specific model program?</p> <p>Does providing technical assistance to build community members' capacity to take active roles in the prevention conducted by their local schools and community-based agencies lead to better outcomes than prevention that is controlled by outside university-based researchers?</p> <p>What is the effect of a technical assistance intervention directed at one ecological level (e.g., individual skills) on the prevention practices and subsequent health outcomes (e.g., public policies) at other levels?</p> |
| 3. Applied research & development | <p>Evaluation of methods (e.g., technical assistance) to build capacity within local communities</p> | <p>To yield significant improvements in capacity, what is the optimal:</p> <ul style="list-style-type: none"> • "dose"? • Delivery channels (in person, web-based)? • Timing (beginning of a prevention effort, after it is established)? • Personnel (community member, professional)? <p>Which technical assistance approaches are the most:</p> <ul style="list-style-type: none"> • Effective in building capacity? • Acceptable to those receiving them? <p>Which aspects of capacity are the most amenable to improvement through technical assistance?</p> |

community capacity and prevention practices (conducting needs assessments; setting goals and objectives; choosing appropriate programming that fits the local context given current resources; planning, implementing, and evaluating programs; and sustaining). There are many existing theories that could be used to test these links. According to theories of cit-

izen participation (Wandersman & Florin, 2000), it could be hypothesized that groups more rooted in the community (capacity element) would be better able to assess and improve the fit of the prevention programs they were considering to implement (prevention practice). According to the theory of community empowerment (Israel, Checkoway, Schulz, &



Adapted from Price and Behrens (2003)

Fig. 2. Pasteur's quadrant.

Zimmerman, 1994), it could be hypothesized that with greater power demonstrated by the community (capacity element), the more likely they would be able to sustain programming (prevention practice). According to benefit and cost theory (Chinman & Wandersman, 1999; Prestby, Wandersman, Florin, Rich, & Chavis, 1990), it could be hypothesized that groups that have, and can better manage resources to maintain their volunteer base (capacity element) will have better implementation and greater sustainability (prevention practices). Leadership theories have shown that leadership skills (capacity element) can greatly influence the successful performance of all the prevention practices (Livet & Wanderman, 2005).

In addition to the link between community capacity and prevention practices, it is likely that communities develop and sustain capacity in the absence of intervention programs, so the relationship between naturally occurring community capacity and outcomes ought to be explored as well. Thus, according to theories of risk and protective factors (Hawkins, Catalano, & Miller, 1992) and developmental assets (Benson, 2003), one could hypothesize that groups more rooted in the community (capacity element) would be better able to conduct needs and resources assessments that would eventually lead to better goals and objectives and choice of appropriate evidence-based interventions (prevention practices). This approach of exploring naturally occurring ca-

capacity is consistent with Shinn and Miller's (2005) call to better understand what already works in communities as an alternative means to improving prevention quality.

In the context of these hypotheses, the study of community capacity theory should assess the strength of these relationships, the relative importance of different elements of community capacity to certain prevention practices, the lag time between a change in community capacity and its subsequent change in prevention practices, and how these relationships operate in different populations, settings, and communities. Also, the issue of ecological levels is important. How does capacity at an individual level affect the prevention practices of an organization like a community coalition or non-profit community agency? What are the relationships between generic community capacity and the capacity to conduct all the practices associated with high quality prevention? These questions not only require reliable and valid measures of community capacity, but also of prevention practices.

Applied Research on Change Technologies: Technical Assistance

Row 3 of Table I presents research questions for studying the effect of community capacity building interventions, in this case technical assistance. This type of research would be standard evaluations of technical assistance as a community capacity building effort and should involve detailed process evaluations of the intervention elements and again, a measure of community capacity as the outcome of interest. This would allow for an examination of the relationships between components of the technical assistance intervention and certain elements of community capacity. Other applied questions could focus on the "dose" of the technical assistance intervention required to yield significant improvements in community capacity, the most appropriate delivery channels (e.g., in person, web-based) and timing (e.g., at the start of a new prevention effort, after it is well-established), and whether a certain dose of capacity is needed at the outset to make effective use of the technical assistance as suggested by some of the literature reviewed above. Other studies could focus on how acceptable various technical assistance approaches are to those receiving them, especially given the resistance to technical assistance demonstrated in the above literature review. In addition,

different technical assistance approaches to community capacity building, targeting different elements of the community capacity construct could be compared. For example, Crisp, Swerissen, and Duckett (2000) describe four general capacity building approaches: (1) “top down,” changing agency policies and practices, (2) “bottom up,” building skills in staff, (3) “partnerships,” strengthening relationships between organizations, and (4) “community organizing,” community members joining an organization, or forming a new one, to improve health. Applied community capacity research could involve assessing the relative advantages of these different approaches. One caveat is that in addition to standard individual level measures of capacities (e.g., individual level skills), these types of evaluations do require attention be paid to community and/or organizational processes (Shiell & Hawe, 1996), such as involvement of key leaders, extent of community collaboration, degree of leverage of local resources (Crisp et al., 2000).

Although technical assistance is an applied change technology, this research could be improved by better specifying a theory that predicts the relationships between certain technical assistance activities and capacity elements, which then (according to general community capacity theory) will have certain impacts on the delivery of prevention and outcomes. Then, applied studies can be implemented to specifically test the utility and accuracy of that theory. For example, while technical assistance research has been mostly pragmatic, some have used community empowerment (Israel et al., 1994) as the theoretical framework to guide technical assistance activities. Accordingly, it could be hypothesized that technical assistance efforts tailored to local communities will build skills (capacity element) needed to implement prevention that would result in an increased likelihood of meeting local needs and ability to secure new funding (prevention practice). Another example comes from diffusion of innovation theory (Rogers, 1995), which predicts how new ideas are incorporated into existing systems. As mentioned earlier, there is some evidence to suggest that those who deliver technical assistance face resistance (e.g., Mitchell et al., in press; Stevenson et al., 2002). Using diffusion theory, it could be hypothesized that technical assistance efforts which are perceived as less complex, more advantageous and compatible with the current state of affairs, and observable (some key elements of diffusion theory) would enhance its utilization and potentially improve the level of community capacity.

Use-Inspired Basic Community Research on Both Community Capacity Theory and Technical Assistance Efforts

The research questions in Row 2 of Table I are examples of use-inspired basic community research that assesses how change technologies (i.e., TA) affect community capacity, which in turn affects prevention practices, which in turn impacts health outcomes. There are many topic areas that would benefit from study using this approach. For example, while many federal organizations (e.g., NIDA, CSAP, ONDCP) have each developed their own list of model programs and best practice principles (Tebes et al., 2002), communities face many challenges in utilizing this information effectively (Schoenwald & Hoagwood, 2001). Therefore, important research questions include which technical assistance interventions can assist practitioners in utilizing model programs effectively, so they can demonstrate results commensurate with those obtained in the initial research trials. Which health outcomes are most amenable to change through technical assistance interventions? Attempting to link technical assistance with outcomes specifically addresses the lack of outcomes demonstrated in the technical assistance literature review above.

In addition, the Substance Abuse & Mental Health Services Administration (SAMHSA) has awarded six models—Communities That Care, Getting To Outcomes, Search Institute’s Asset Model, Western CAPT, Rensselaerville Institute, and Pathways to Effective Programs and Positive Outcomes—as “best practice prevention processes” that are thought to be associated with high quality prevention. All of these processes attempt, at least in part through technical assistance, to build community capacity to enhance prevention outcomes, and research could be conducted to specifically assess which are best for different prevention practices, health outcomes, and settings. Another key area for study, highlighted by Mitchell et al. (2002) is the choice of technical assistance interventions to focus on building generic capacity (e.g., knowledge about how to use one of the “best practice” processes) versus building capacity to implement specific model programs (e.g., Life Skills Training). Although Mitchell et al. (2002) offer useful suggestions for navigating this choice (e.g., use proper assessment tools to establish technical assistance needs, set technical assistance objectives, and allow sufficient time), this is an excellent example of use-inspired basic community

research: a comparison of these two approaches in their ability to enhance community capacity, improve the delivery of prevention programming (whether an existing or locally developed program) and impact health outcomes.

Community power and empowerment have long been associated with increased capacity suggesting the need to assess whether empowering communities or organizations lead to better health outcomes compared to a more top-down approach. For example, does providing technical assistance to build the capacity of community members to take active roles in the prevention conducted by their local schools and community-based agencies lead to better outcomes than prevention that is under the control of outside university-based researchers?

Again, how technical assistance interventions and capacity theories work across ecological levels is of great interest (Goodman et al., 1998). For example, what is the effect of a technical assistance intervention that is directed at one ecological level (e.g., individual, program, organization, community) on the prevention practices and subsequent health outcomes at other ecological levels? Can a technical assistance intervention that attempts to improve the skills of individuals to conduct prevention improve their social capital and subsequently, their health outcomes? Are some technical assistance interventions more effective at producing change in community capacity at multiple levels than others? Does improving community capacity within more than one level have greater effects on prevention practices and health outcomes than focusing on a single level?

AN EXAMPLE OF COMMUNITY SCIENCE RESEARCH OF COMMUNITY CAPACITY FOR PREVENTIVE INTERVENTIONS

We now describe a current project that is an example of the Community Science research agenda and combines basic and applied research. This project attempts to evaluate the effectiveness of a community capacity building effort *and* enhance our basic understanding of how capacity in local organizations affects prevention practice and outcomes. The project (Chinman et al., 2004) involves employing the Getting To Outcomes (GTO) model as a capacity enhancing intervention in two community-based substance abuse prevention coalitions. Incorporating traditional evaluation (Rossi, Lipsey, & Freeman, 2004), empowerment

evaluation (Fetterman, 1996), results-based accountability (Osborne & Graebler, 1992), and continuous quality improvement (Deming, 1986; Juran, 1989), GTO's 10-step process enhances practitioners' prevention skills while empowering them to plan, implement, and evaluate their own programs (Chinman et al., 2001; Wandersman, Imm, Chinman, & Kaftarian, 2000, Wandersman, Kaftarian, Imm, & Chinman, 1999). The GTO manual, published by the RAND Corporation (Chinman, Imm, & Wandersman, 2004; available for download at no cost at <http://www.rand.org/publications/TR/TR101>) has text and worksheets that help users address: needs and resources assessment, goals and objectives, choosing programs, ensuring program "fit," and capacity, planning, process and outcome evaluation, continuous quality improvement, and sustainability. GTO is meant to be a "best practice process (Green, 2001)": prescriptive, yet flexible enough to facilitate any preventive program.

The GTO intervention includes: (1) the GTO manual, (2) yearly interactive training sessions that involve using the concepts and worksheets with both hypothetical and real situations, and (3) on-site technical assistance (about 2 hr a week per program) by research staff. Following the model in Fig. 1, we will track the coalitions' use of the community capacity building intervention (i.e., GTO) by using one of the standardized assessment techniques (called "Level of Use") of the Concerns-Based Adoption Model (CBAM; Hall & Hord, 2001). The Levels of Use was developed to monitor the process that individuals go through as they implement an innovation, in this case GTO. In addition, we are collecting qualitative field notes on the technical assistance process. We are using a survey to assess the domains of community capacity (skills, power, resources, community) administered to all members of the two coalitions before GTO implementation, and at 12 and 24 months. We are using another instrument of the CBAM (called the Innovation Configuration Map) to rate the quality of implementation of all of the practices known to be associated with high quality prevention. Finally, we are collecting data from the individual coalition program evaluations and school survey data to track outcomes. As an example of "use-inspired basic community research," this design will test how a capacity building intervention improves capacity, which is hypothesized to enhance prevention practices, which in turn is hypothesized to improve health outcomes.

After about 1 year of implementation, over 60 persons from both coalitions have been trained and

six programs have begun to receive technical assistance on completing the GTO steps. Although too early to systematically assess results, field notes show the GTO process, facilitated by the technical assistance, is already changing the way the programs are implementing prevention. The programs have created logic models to clarify their goals and objectives and ensure their link to program activities, managed staff changes, used data to improve ongoing implementation, and improved the design and instruments of their outcome evaluations. While the small sample will limit statistical conclusions, final results will illustrate how the model improves community capacity and program-level health outcomes as well as enhance our understanding of how community capacity affects the quality of preventive interventions.

CONCLUSIONS

Communities face significant challenges addressing substance abuse and other behavioral health problems. However, there is empirical evidence to show that prevention programming conducted with quality can yield improved health outcomes and recoup funds otherwise spent on substance abuse treatment and criminal justice costs (e.g., Spoth, Guyll, & Day, 2002). Quality is the challenge. While there are several evidence-based prevention programs available that address a wide range of risk and protective factors, many are not implemented with quality—a significant contributor to the gap between science and practice. Building community capacity can be the means to improve the quality of prevention and achieve positive health outcomes. Therefore, we need to better understand community capacity and its relationships to prevention practice and outcomes. As shown in Table I, basic science, applied, and use-inspired basic community research approaches, rooted in Community Science, can be the mechanism to improve our understanding, helping to narrow the gap between science and practice in prevention. This is because Community Science emphasizes developing and testing both theories and change technologies (and their relationships) in real communities. In contrast, the more traditional model of the prevention intervention research cycle (National Advisory Mental Health Council, 1998) identifies the etiology of certain problems, tests interventions under controlled conditions, and then attempts to import the intervention to real-world settings. In other words, Community Science “. . . begins with the state of the

practice of prevention in the community and assesses what needs improvement. . . [while] the prevention intervention research cycle focuses on how science can be brought into the community (Wandersman & Florin, 2003, p. 445).”

It should be noted, however, that a focus on community capacity, as defined here, does not address all the factors that contribute to the gap between science and practice. For example, the political climate surrounding the governance of prevention policy, the transportability of evidence-based prevention programs, and the funding at the state and national levels can all greatly impact local communities' ability to implement prevention and achieve outcomes. While these factors may be out of the control for most communities, the domains of community capacity may be more amenable to intervention. Therefore, as a supplement to the research on evidence-based program efficacy, we offer a research model and agenda, rooted in Community Science, on how to build community capacity to improve prevention quality.

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