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An Ecological Assessment of Community-Based Interventions for Prevention and Health Promotion: Approaches to Measuring Community Coalitions[1]

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Presented an ecological assessment of a community coalition to prevent alcohol, tobacco, and other drug abuse, and related risks. Ecological assessment is defined as occurring at multiple social levels and along a continuum of stages of coalition readiness. The assessment is aided by the triangulation, or combining of assessment methods and strategies. Measures used to assess the coalition's formation, implementation of community initiatives, and production of community impacts are described, along with the triangulation strategies used to enhance the assessment findings.

KEY WORDS: ecological assessment; community-based intervention; assessing community coalitions; triangulation strategy.

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Disciplines concerned with the overall health of communities, such as community psychology and public health, are experiencing a shift in emphasis from social psychology to social ecology. The traditional approach to community health development is grounded largely in social psychology where successes often are calibrated as changes in the risk-producing behaviors of individuals (Hawkins & Catalano, 1992; McLeroy, Bibeau, Steckler, & Blanz, 1988; Steckler et al., 1995). For example, the National Institutes of Health funded several large-scale community health studies that extended from social psychology models, including the Stanford Five-Community, the Minnesota Heart Health, and the Pawtucket Heart Health Studies (Elder et al., 1986; Farquhar et al., 1985; Jacobs et al., 1986). These projects used a combination of strategies directed at different segments of communities (often referred to as channels), but the project evaluations were directed largely at behaviorally based outcomes such as weight reduction, modification of food buying habits and other diet-related risk behaviors, reduction in blood pressure, cholesterol, pulse rate, smoking, and coronary heart disease and mortality risk (Mittelmark, Hunt, Health, & Schmid, 1993). Although reductions in risk-associated behaviors are desirable outcomes of community interventions, such changes often depend on larger level social changes, or alterations in the social ecology (Stokols, 1992; Winett, 1995).

In an ecological perspective, the potential to change individual risk behavior is considered within the social and cultural context in which it occurs. Interventions that are informed by this perspective are directed largely at social factors, such as community norms and the structure of community services including their comprehensiveness, coordination, and linkages, in addition to individual motivations and attitudes. As Thompson and Kinne (1990) state:

> The increasing focus on "community" in health promotion is due, at least in part, to growing recognition that behavior is greatly influenced by the environment in which people live. Proponents of community approaches to behavioral change recognize that local values, norms, and behavior patterns have a significant effect on shaping an individual's attitudes and behaviors. (p. 45)

The premise of this article is that as community interventions become complex, less focused on individual behavior change, and based on ecological principles, the assessments that accompany them also must develop in complexity. This paper begins by defining important characteristics of an ecologically based assessment as occurring (a) at multiple social levels; and (b) along a continuum of stages of community readiness; then, (c) triangulation as an assessment strategy is discussed, followed by the application of these three principles to the evaluation of the Midlands Prevention Alliance, a community coalition funded by the U.S. Center for Substance Abuse Prevention. Assessment instruments are described that focus mainly beyond individual behavior, across ecological levels, and across stages of community readiness.

Ecological Approaches as Intervening Across Multiple Social Levels

The literature on social ecology emphasizes the need for multiple intervention strategies targeted at multiple social strata. Kelly (1966) proposed that interventions occur at multiple levels because the elements of a community system are interdependent and interventions directed at one element can affect others. Multiple interventions directed at multiple strata can maximize the effect that an initiative has throughout the community. Winett, King, and Altman (1989) detailed strategies that combine social psychology approaches aimed at individual risk behavior with public health approaches that are directed at larger sectors of the population. McLeroy et al. (1988) wrote that ecologically directed interventions should influence intrapersonal factors "such as knowledge, attitudes, behavior, self-concept, skills"; interpersonal and group processes, including "formal and informal social network and social support systems [such as] the family, work group, and friendship networks"; institutional factors including the range of organizations that serve and influence individuals and the rules and regulations that these organizations apply; community factors including "relationships among organizations, institutions, and informal networks"; and public policy, regulations, ordinances and laws at the local, state and national levels (p. 355). McLeroy, Steckler, Goodman, and Burdine (1992) have developed a matrix that details the change processes, theories or models, targets of change, and strategies and skills for each level of the social ecology (intrapersonal, interpersonal, organizational, community, and public policy). They noted that the challenge in employing ecological approaches is to specify the relationships among causal processes operating both within and across levels, and to identify combinations of interventions that are synergistic across levels.

Ecological Approaches as Intervening in Multiple Stages of Readiness

Applying multiple strategies synergistically across multiple levels of the social ecology is important but insufficient in developing effective community-based interventions. A growing body of evidence suggests that the selection of the appropriate multileveled interventions also is contingent on the community's stage of readiness and its competence to address presenting social concerns (Cottrell, 1976; Goeppinger & Baglioni, 1985). For instance, Florin, Mitchell, and Stevenson (1993) wrote that accounting for the stages of coalition readiness — including initial mobilization,

establishing organizational structure, building capacity for action, implementing, refining, and institutionalizing — is essential in determining the appropriate type of training and technical assistance to provide community coalitions. Goodman, Wheeler, and Lee (1995) wrote about the consequences of not allowing for these stages to be fully nurtured. A community initiative, funded by the Centers for Disease Control and Prevention, and directed at cardiovascular disease, had 5 years to develop the entire project infrastructure, orient staff, cultivate working agreements, gain acceptance in the community, gather data, gain community input, plan, develop interventions, sustain activities, and produce changes in health status. This ambitious agenda and the imposed time pressure resulted in the project attenuating the community development process and implementing a less effective intervention. Goodman and colleagues maintain that the project needed more time to establish prerequisite conditions for community change before behavioral and health status outcomes could be realized.

The notion that appropriate interventions are related to stages of readiness is consistent with the ecological principle of adaptation which refers to the community's ability to react constructively to changes in the environment (Kelly, 1966). When faced with a pressing social concern, key characteristics of a community's adaptability are its readiness and capacity to mobilize, structure, initiate, refine, and sustain an organized response. The principle of stages of readiness also is consistent with contingency theory which posits that the presenting conditions at a given stage should influence the careful selection of the most efficacious strategies (Kaluzny & Hernandez, 1988). The application of an effective strategy, but at an inappropriate state, can actually delay or disable a project (Goodman & Steckler, 1990). For instance, many alcohol, tobacco and other drug coalitions that we evaluate employ "Red Ribbon" campaigns, in which members mobilize *en masse* and place red ribbons on highway overpasses and other visible places in communities. The campaign is meant to be a visible reminder of the dangers of substance abuse and driving. Such campaigns seem particularly appropriate during the initial mobilization stage to raise community awareness, but they are not likely to be effective in producing sustainable changes in community health status indicators, such as the number of alcohol-related traffic fatalities. For health status change to occur, the coalition must add strategies that coordinate among agencies, provide intensive prevention programs and services, and implement and monitor policies that promote and reinforce healthy environments.

Another illustration of strategy as contingent on stage of readiness occurred in one of the Center for Substance Abuse Prevention-funded coalitions that we evaluate. The lead agency had difficulty in coordinating coalition operations due to concerns that other member organizations had over "turf," or who would lead the coalition (Goodman & Wandersman, 1994; Wandersman et al., 1996). Resolving turf issues to enhance coordination is what Florin et al. (1993) referred to as the "establishing organizational structure" stage of readiness. As a result of conflict over turf, the coalition's ability to build capacity for action, the next stage of readiness, was delayed. The turf issue was resolved by the hiring of a new director who was skilled at negotiation and compromise, and whose diplomacy helped to reduce turf concerns. In another instance, a coalition tried to influence the establishment of employee assistance programs for those with substance abuse problems by producing literature and holding workshops on such programs for local businesses. This strategy did not address employer concerns about the cost and liability of operating employee assistance programs; consequently, no local business adopted such a program. In essence, the coalition used awareness strategies that were more appropriate at the initial mobilization stage, rather than refining its strategies to address employer concerns over liability and expense associated with many employee assistance programs. Our experience indicates that many coalitions have greater difficulty with the middle and later stages of readiness, such as implementation, refinement, and institutionalization, and continue to employ awareness strategies to diminishing effect. These illustrations suggest that interventions informed by ecological principles must extend beyond the application of interventions across multiple social strata. Ecologically sensitive interventions also must be designed for the stage of community readiness, and the selection of interventions should facilitate development from one stage of readiness to the next.

The import of stage of readiness is that interventions which are informed by the ecological perspective should be conceptualized across two dimensions: First, the multiple social levels at which interventions are directed (intrapersonal, interpersonal, organizational, community, and public policy); and second, the stage of readiness of a community (initial mobilization, establishing organizational structure, building capacity for action, implementing, refining, and institutionalizing). Such criteria pose a unique problem not only for developing efficacious interventions but also for evaluation. Traditional evidentiary approaches may not be applicable in assessing complex interventions. For instance, randomized controlled designs may be impractical, expensive, and unwieldy. The empirical basis for testing effectiveness may rely on case methods and other qualitative approaches, surveys of key informant perceptions of effectiveness, and the triangulation, or

combination of these methods with experimental and quasi-experimental designs (Steckler, McLeroy, Goodman, McCormick, & Bird, 1992). The assessment discussed in this paper makes extensive use of triangulation as a strategy for evaluating a complex community intervention.

Triangulation as a Strategy for Ecological Assessment

Triangulation is the use of multiple methods in the study of phenomena (Denzin, 1978). Other terms for triangulation include multiple operationalism, combined operations, mixed strategies, and multiple strategies (Blaikie, 1991). Triangulation is employed for two main purposes: to overcome, by combining methods, the bias inherent in any one method, and to increase validity because different methods highlight different aspects of phenomena. Denzin (1978) extended triangulation beyond multiple methods to include the following: (a) triangulation of data, which includes triangulating different times that data are gathered, space or ecological units across which data are collected, and different persons or subjects of data acquisition; (b) triangulation of investigators' perspectives; and (c) triangulation of theories that inform the phenomena under study.

It should be noted that triangulation is controversial. Some argue that triangulation has limited utility because the multiple methods and data that are often used extend from different and incompatible philosophical positions. For instance, critics stress that positivistic inquiry, which generally is associated with quantitative methods, is irreconcilable with naturalistic inquiry, which generally is associated with qualitative methods (Blaikie, 1991). Others contend that methods need not be linked to such paradigms and illustrate how quantitative and qualitative approaches can be combined productively in both experimental and ethnographic studies (Maxwell, Bashook, & Sandlow, 1987; Steckler et al., 1992). Our stance is consistent with the latter point of view as reflected by Steckler et al. (1992) who assert that

> social interventions, such as health education and health promotion programs, are complex phenomena which require the application of multiple methodologies in order to properly understand or evaluate them . . . today the issue no longer is whether to use quantitative or qualitative methods, but rather how they can be combined to produce more effective evaluation strategies. (p. 4)

In the assessment of the Midlands Prevention Alliance to be presented in the next section, the data were collected using a variety of methods, with each method producing its own result. Then, qualitative comparisons of results were made across methods to cross-validate and enrich study findings (Steckler et al., 1992).

A DESCRIPTION OF COMMUNITY COALITIONS FUNDED BY THE CENTER FOR SUBSTANCE ABUSE PREVENTION

In 1994, the Center for Substance Abuse Prevention awarded 22 grants to develop coalitions to address health issues such as alcohol, tobacco and drug abuse, HIV-AIDS, sexually transmitted diseases, and violence. Several South Carolina counties in and surrounding the greater Columbia metropolitan area applied jointly as the Midlands Prevention Alliance and received one of the grants. The grant was funded for 5 years (1995–1999) at $4,285,495 for the duration and included 20% for the evaluation. The Center's intent in funding the evaluation at 20% of the grant was to insure that the evaluation could capture the complexity of the coalition initiative and be supportive of the formative process.

In its grant application, the Midlands Prevention Alliance proposed the following outcomes and target groups: a change in the overall norms of the entire Midlands community regarding alcohol, drug and tobacco use; increased involvement in remediating these problems in local workplaces; reduction of substance use and violence among 12 to 17-year-olds; and reduction in the annual incidence of HIV/AIDS and sexually transmitted diseases throughout the South Carolina Midlands. In addressing these risks, the Alliance's grant application reflects an ecological perspective by depicting substance abuse and related risks to be primary, persistent, complex, and embedded social problems in many communities (Bailey, 1989; Jessor & Jessor, 1977). The proposal identifies multiple, interacting factors as contributing to susceptibility to these health risks including individual influences, such as degree of coping skills, self-esteem, and communication skills; family influences, such as family cohesiveness, parental modeling, and parenting skills; and community influences, such as the presence of supportive resources, sound economic conditions, and the limited availability of potentially harmful substances. These factors can interact, either to create a potential for risky behavior such as substance abuse or to protect youth from the abuse of harmful substances (Hawkins & Catalano, 1992; Oetting & Beauvais, 1987). Consequently, the grant application posits that programmatic interventions must occur at multiple social levels if behavioral risks are to be reduced. Furthermore, due to the complexity of the problem, effective prevention efforts must be theoretically based, comprehensive, long-term, applied at the appropriate stage, and focused on social factors and not solely on education and individual behavioral change (Hansen, 1992).

The Alliance's grant application also provides an overview of its proposed community intervention. The intervention occurs in three phases: Phase 1 involves forming the coalition by hiring staff, recruiting members from multiple sectors of a community, and involving the membership in a needs assessment that informs their planning of community strategies. Phase 2 concerns implementing these strategies in the form of awareness campaigns, service programs, and policy initiatives. Phase 3 involves the institutionalization of these programs and policies, the production of salutary community impacts, and the maintenance of the coalition once grant funding terminates.

THE EVALUATION OF THE MIDLANDS PREVENTION ALLIANCE AS INFORMED BY ECOLOGICAL PRINCIPLES

Table I underscores how the ecological principles of intervening at multiple levels and developing strategies that are appropriate at each stage of community readiness apply to the evaluation of the Midlands Prevention Alliance. The phases and measures appear on the vertical axis of Table I, along with their corresponding stages of coalition readiness. The levels of the ecology appear on the horizontal axis. The evaluation focuses on the process of coalition formation (or readiness stages of initial mobilization and establishing organizational structure) in Phase 1; on the planned implementation of community initiatives (or readiness stages of building capacity for action and implementing) in Phase 2; and on producing and sustaining impacts, or changes in local organizations' delivery of services and community health status (or readiness stages of refinement and institutionalization) in Phase 3. The cells in Table I are marked with an "X" to indicate where the evaluation measures operate across the coalition's developmental phases, readiness stages, and ecological levels. A significant strength of our evaluation is that we have already developed and community-tested most of our evaluation instruments in four previous coalitions in South Carolina with considerable success. In the following section, each measure is discussed to illustrate how it contributed to an ecologically based assessment.

Phase 1: Formation

Forecast Evaluation

In Phase 1, the evaluation of the Midlands Prevention Alliance is formative to assure that this complex community project develops with fidelity

to the concept that was submitted in the proposal to the Center for Substance Abuse Prevention. The measures used to gauge formation are directed at several ecological levels, but primarily at the organizational, inter-, and intrapersonal levels. To assess formation, the evaluators employ the Forecast System which is detailed elsewhere (Goodman & Wandersman, 1994). Briefly, Forecast consists of four components: models, markers, measures, and meaning. Models are diagrams of the problem to be addressed and the related project interventions. The evaluators develop these models by converting the description of the problem and proposed intervention that appear in the grant application into one-page diagrams. The models are useful in visualizing the intervention, but they cannot assure adequate implementation. Therefore, the evaluators work with project members to develop markers based on the models to indicate whether the project is developing as planned. To develop the markers, the evaluators encourage project participants to think of the project model as a road map and the markers as milestones or road signs indicating that the project has reached a certain distance on the map. The measures are based on the markers and provide the data for judging whether a marker has been attained. Where a measure indicates the accomplishment of a marker, then the project is developing with fidelity to its original construct. Meaning is the interpretation of the project's developmental successes based on markers achieved. In the Forecast System, meaning involves two related processes: (a) identifying a minimum standard of performance for attaining each marker, and (b) determining how the project may need to adjust according to the number and type of markers that are judged as not meeting the set standards.

Using the Forecast System, the evaluators continually monitor the Midlands Prevention Alliance's formation, encouraging systemic adjustments to assure that the coalition develops according to plan. The evaluation's focus on formation is consistent with the early readiness stages of initial mobilization and establishing organizational structure (see Table I). Where the evaluators identify deviations from planned development, they problem-solve with staff and members to identify the types of adjustments that may put the project operations back on track, or to alter the plan. Typical measures used in Forecast include analysis of meeting minutes, phone logs, staff activity calendars, vita of coalition members, and other program documentation. Two measures are used to assess the effectiveness of particular meetings: the Meeting Effectiveness Inventory and the Project Insight Form. Individual participants and evaluation staff rate the meetings for leadership, participation, decision making, conflict resolution, and productivity using the Meeting Effectiveness Inventory (Fig. 1). The evaluators aggregate the results, using bar charts, and share these with

Table I. Evaluation of MPA by Developmental Phases, Ecological Levels, and Stages of Readiness

	Ecological levels					
Developmental phases and measures	Intra-personal	Inter-personal	Organiz-ational	Community	Public Policy	Stages of readiness
Phase 1: Coalition formation						
Forecast			X			Initial mobilization and establishing organizational structure
Meeting Effectiveness Inventory	X	X	X			
Project Insight Form	X	X	X			
Committee survey	X	X	X			
Needs Assessment Checklist			X	X		
Plan Quality Index			X	X	X	
Phase 2: Plan implementation						
Tracking of Actions			X	X	X	Building capacity for action and implementing
Prevention Plus III	X	X	X	X	X	
Policy Analysis Case Study			X		X	
Phase 3: Impact						
Key Leader survey	X		X		X	Refining and institutionalizing
Community survey	X			X		
Trend data				X	X	
Level of Institutionalization Scale			X	X	X	

1. How clear were the goals from the agenda of this meeting to you? (circle one)

Poor (e.g. unclear, diffuse, conflicting, unacceptable)	Fair	Satisfactory (e.g., moderately clear, shared by some)	Good	Excellent (e.g., clear, shared by all, endorsed with enthusiasm)
1	2	3	4	5

2. What was your general level of participation in this meeting? (circle one)

Poor (e.g. was bored or distracted, low verbal participation)	Fair	Satisfactory (e.g., paid attention about half the time)	Good	Excellent (e.g., paid attention, participated in the discussion)
1	2	3	4	5

3. Who chaired the meeting? (Put an X in the appropriate space)
No One__ Consultant__ Staff__ Committee Member__ Chairperson or Co-Chairpersons__ Other_____

4. What was the leadership like in this meeting? (circle one)

Poor (e.g. group need for leadership not met)	Fair	Satisfactory (e.g., some direction was provided)	Good	Excellent (e.g., a clear sense of direction was provided)
1	2	3	4	5

5. What was the quality of the decision-making at this meeting? (circle one)

Poor (e.g. decisions were dominated by few members)	Fair	Satisfactory (e.g., about half the members present participated)	Good	Excellent (e.g., everyone took part in decision making)
1	2	3	4	5

6. What was the cohesiveness among the members at this meeting? (circle one)

Poor (e.g. antagonistic towards each other)	Fair	Satisfactory (e.g., moderate amount of trust present)	Good	Excellent (e.g., members trusted and worked well with each other)
1	2	3	4	5

7. Was there conflict present at this meeting? _____ No _____ Yes, (please describe)

8a. If there was conflict present, was the conflict resolved?
_____ No _____ Yes

8b. If the conflict was not resolved, please check why.
_____ Conflict avoided, not discussed
_____ Members argued with one another
_____ Other (specify)_____

9. How well was this meeting organized? (circle one)

Poor (e.g. chaotic, poorly organized)	Fair	Satisfactory (e.g., moderately well organized, some confusion)	Good	Excellent (e.g., well organized all went smoothly)
1	2	3	4	5

10. How productive was this meeting? (circle one)

Poor (e.g. not much accomplished, wasted too much time)	Fair	Satisfactory (e.g., accomplished a moderate amount, some time wasted)	Good	Excellent (e.g., much accomplished, good use of time)
1	2	3	4	5

What could have been done to make this meeting more effective?
Please provide any additional comments you would like to make about this meeting:

Fig. 1. Meeting Effectiveness Inventory.

the coalition at the next meeting for discussion. At the end of each meeting, the evaluators use the Project Insight Form to confer with the meeting chairperson and project staff. Here an evaluator poses a series of open-ended questions about factors that facilitated and inhibited the coalition's work at the meeting. Answers are aggregated across several meetings and the evaluators incorporate the results into quarterly debriefings with coalition members.

As Table I indicates, the Meeting Effectiveness Inventory and Project Insight Form are examples of organizational-level measures as they are directed at committee operations, or the initial mobilization and establishing organizational structure stages of readiness. In the Midlands Prevention Alliance, effective committee operations are crucial to the organization of the coalition, because the committees conduct community needs assessments, formulate community plans, and spearhead plan implementation. Therefore, the success of the Alliance is predicated on building a strong organizational infrastructure through its committee system. The formation of the infrastructure depends on good working relationships among committee members and staff. Therefore, the measures at the interpersonal level are embedded within the organizational-level measures and include the quality of interaction among coalition partners, staff, consultants, and evaluators. Information from these measures assesses whether an organizational network is developing that is well coordinated among the key stakeholders in the coalition. Intrapersonal-level measures are included to assess member satisfaction with committee operations, thus indicating whether coalition stakeholders remain motivated to support the organization.

The use of the Meeting Effectiveness Inventory and Project Insight Form illustrate a form of triangulation of methods and space (or operations across ecological levels). The data from the inventory are converted into mean scores and each score is amplified by listing the open-ended comments for each rating. In addition, the data from the inventory and Project Insight Form are triangulated to explore how they are complementary and to highlight different dimensions of meeting effectiveness. For instance, we found that the scores from the Meeting Effectiveness Inventory indicate low levels of participation and that the Project Insight Form data suggest a need for more proactive member recruitment strategies to increase attendance and involvement at meetings. Taken together, the inventory and form data provide a quantitative assessment of member concern, a qualitative explanation of the concern, and a suggested strategy for alleviating it.

Committee Survey, Profiles, and Feedback

To further assess coalition formation, the Forecast System is triangulated with a survey and feedback process based on the Block Booster Project, a neighborhood development initiative (Florin, Chavis, Wandersman, & Rich, 1992). After the committees have met for several months, the evaluators ascertain committee climate, member satisfaction, task orientation, leadership characteristics, staff support, costs and benefits of membership, communication among committee members, linkages established with community organizations, and conflict resolution by administering a 127-item survey to committee members. The survey, its factors and factor loadings are detailed elsewhere (Butterfoss, Goodman, & Wandersman, 1996). Once the survey data are analyzed, the evaluators produce committee profiles, consisting of bar charts illustrating the distribution of committee members' responses on each dimension, and a handbook of suggested strategies as part of a feedback process for committee reflection. The data are reported in the aggregate to maintain confidentiality so that individual respondents cannot be identified.

Previously, we have used the survey and feedback process in our evaluation of several coalitions and have found that characteristics such as leadership, shared decision making, linkages with other organizations, and a supportive group climate produced members who were satisfied with and participated in the work of the coalition (Butterfoss, Goodman, Wandersman, Valois, & Chinman, 1996). Establishing member satisfaction is a primary concern during coalition formation because it facilitates the initial mobilization process, the development of organizational structure, and the building of capacity for action stages of coalition readiness. The survey also illustrates how data derived at one ecological level may be applied across levels. To illustrate, one coalition used the survey data in a way that we had not anticipated. Early in its development, the coalition was challenged by a local newspaper to demonstrate how the expenditure of funds was of benefit to the local community. Since the coalition was just formed and it was too early in the process to provide data on project impacts, the coalition used the survey results to demonstrate that its members were deriving benefits from serving on committees, and were confident that they could make a difference in substance abuse prevention in their community. These data satisfied the newspaper and forestalled possible negative publicity. This example illustrates that complex community projects like coalitions must be concerned, even at their inception, with cultivating a supportive and nurturing environment. Evaluation informed

by ecological principles might take a measure, like the committee survey, that is focused at the organizational level, and, at the same time, use the survey result to cultivate support at the community level. Moreover, the evaluators triangulated survey results concerning member satisfaction with similar measures embedded in the Meeting Effectiveness Inventory and Project Insight Form. By presenting all three measures to coalition members, the evaluators provided a rich picture of committee functioning that cut across the intrapersonal, organizational, and community levels of the ecology.

Needs Assessment Checklist and Plan Quality Index

Once the coalition structure is formed and functioning, the committees implement a community needs assessment, collect and analyze the resulting data, prioritize needs, incorporate them into a formal plan, and develop coalition strategies based on plan priorities. During the Midlands Prevention Alliance's formative phase, the needs assessment and plan development are critical since they shape the coalition's community-wide intervention strategies. Therefore, the evaluation focuses on the committees' needs assessment and planning efforts. Referring to Table I, measures for needs assessment and planning are concentrated at the organizational and community levels. The evaluators use a 17-item Needs Assessment Checklist that prompts the coalition to specify the steps in the development, implementation, and analysis of the needs assessment. If the coalition committees are successful in achieving the steps on the checklist, a community plan results. The evaluators use a Plan Quality Index to rate the adequacy of the resulting plan. The index assesses the adequacy of components of committee plans including the level of specificity of program goals, objectives, and activities; the presence of a time line for activities and specification of who coordinates activities; specification of target groups and strategies for developing community support; details regarding a budget, facilities, equipment, and supplies for activities; and possible barriers to plan implementation and possible solutions for overcoming these barriers (Butterfoss et al., 1996). Once the index is completed, the evaluation team prepares a narrative based on the ratings that reflects the plan's strengths and the challenges facing the coalition in implementing the plan effectively. This narrative is shared with coalition staff and members so that they can take the feedback into account when implementing community initiatives.

The Needs Assessment Checklist and Plan Quality Index are in print elsewhere (Butterfoss et al., 1996). The checklist and index help the coalition gauge whether it is approaching the stages of readiness for building capacity for action and implementation (Table I). To further facilitate capacity development and readiness, the evaluation team provides training to coalition members during the plan development phase on how to write a quality prevention plan based on a training manual that we developed (Butterfoss et al., 1996).

The evaluators triangulated the committee survey results, which indicated that committees were quite satisfied and involved with their work, with the Plan Quality Index results, which indicated that the quality of the plans which the committees produced rated moderate to low (Butterfoss et al., 1996). Thus, satisfaction and participation alone were not enough to assure that plan adequacy resulted. The comparison of survey and index results is an illustration of method triangulation (Denzin, 1978), whereby the evaluators enriched their appreciation for the need to enhance committee capacity beyond satisfaction to effectively develop and implement a community plan of action. As a result, the evaluators intensified their advocacy for high-quality plan development and implementation by increasing the number of workshops and frequency of consultation devoted to these issues. In addition, the evaluators deemphasized the quantitative rating of plan quality, focusing more on qualitative feedback to the coalition in the form of written narratives that included the following operational concerns: What are the goals of a planned initiative, how does the initiative address the goals, at whom is it targeted, who will be designated to lead the initiative, who will provide the resources for its operation, what type and how many sessions comprise the effort, where will it be housed, what outcomes will it produce, how will they be measured (Butterfoss et al., 1996)? These concerns become core components of the Phase 2 evaluation which concentrates on the coalition's stages of readiness for building capacity for action and implementing.

Phase 2: Plan Implementation

In progressing from Phase 1 to Phase 2, the coalition moves from one set of readiness stages (initial mobilization and establishing organizational structure stages) to the next (building capacity for action and implementing stages), and the evaluation reflects this transformation. Our previous work with coalitions (Butterfoss et al., 1996; Goodman, Steckler, Hoover, & Schwartz, 1993) demonstrates that community groups often are effective at Phase 1 activities: they are fairly well organized, productive in

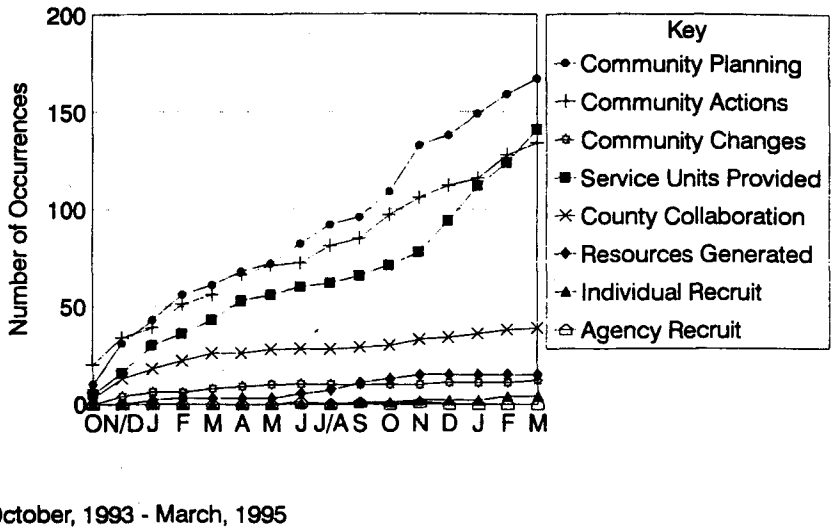

Fig. 2. Process activities.

doing a needs assessment, able to prioritize needs and to develop a modest community plan. Yet, community groups have more difficulty in shifting to Phase 2 activities, such as translating the plan into effective community actions that produce meaningful outcomes. The evaluation, in moving from Phase 1 to Phase 2, emphasizes the Phase 2 concern with adequate implementation. For instance, the intrapersonal and organizational level measures of committee and staff functioning taken at Phase 1 are maintained in Phase 2, but the Phase 2 assessment concentrates on the delivery of effective program and policy initiatives. The next sections illustrate how the Phase 2 evaluation measures focus on effective implementation of planned community actions, events, activities, and services.

Tracking of Coalition Actions

The evaluation team uses "Tracking of Actions" logs to monitor the coalition's level of effort at implementing community initiatives. The logs are a modified version of the charting strategy developed by Francisco, Paine, and Fawcett (1993). Coalition staff record the following types of activities on monthly "event logs": community planning, community actions, community changes, collaboration, members recruited, and

resources generated. The evaluators transform the logged data into graphs like Fig. 2, which the evaluators provide to the staff along with a brief narrative of the monthly levels of coalition effort. The tracking logs are directed mainly at the organizational, community, and policy levels of the ecology. For instance, log data for planning, collaboration, membership, and resources gauge the organization's operations, as these areas are essential attributes of well-run initiatives. But, the logs also are community assessment tools in that membership reflects the willingness of community residents to join the organization, collaboration reflects the degree to which community organizations cooperate in planned coalition initiatives, and community change represents outcomes like the addition or alteration of service provision. Also, the tracking of community changes are policy level measures, as they include important policy results, like the passage of laws that restrict open alcohol containers on city streets, or restrictions on placing cigarette vending machines in areas used predominantly by minors.

The log data are graphed cumulatively from month to month so that trends in effort can be assessed over time. For instance, in the Fig. 2 chart, community planning, actions, and service units occur with the greatest frequency. But large community-level changes, resources generated, and individual and agency members recruited are scant. Thus, many activities seem to be occurring, but the support necessary to sustain them and the significant community changes that should result are lacking. As a result of contrasting the high levels of activities and low level of support that are reflected in the process logs, the evaluators were able to provide the coalition with important feedback and influence the way it enlisted the support of important community organizations. The comparison of these different trends is what Denzin (1978) referred to as within-method triangulation, whereby one method is composed of multiple contrasting scales. The logs also illustrate time triangulation, where, for example, the resources generated by the coalition are compared over time to assure that an adequate resource base is maintained throughout the coalition's life-span.

Coalition staff find the graphs understandable and use them to gain community support. To illustrate, the staff use the graphs to explain the nature and intensity of the coalition's initiatives to its committees, other civic groups, and potential funding agencies. Also, staff include the graphs in newsletters to community residents. Coalition volunteers report liking to see at a glance the trends over time. The graphs provide a sense of history ("where have we been?") and suggest future trends as well ("where are we going?"). Staff also find the graphs useful in demonstrating to volunteers why certain activities are important. For instance, staff have used

the Community Changes graph to encourage volunteers to think about how the initiatives in which they are engaged will result in community change. From our experience, Center for Substance Abuse Prevention-funded coalitions expend considerable effort in planning, performing community actions, and providing service units. However, after several years of doing these activities, the coalitions have produced few community changes. The log data indicate that during implementation, the coalitions focus primarily on awareness activities such as the aforementioned Red Ribbon Campaigns and raising awareness alone does not produce lasting, significant change in the community. Thus, the evaluators use the log data to stimulate the coalition to think beyond the implementation stage of readiness to the stages for refinement of interventions and institutionalization of community changes.

Assessments of Coalition Initiatives Using Prevention Plus III

Implementation of effective community initiatives requires much time, effort, organization, and resources. Because of these demands, many such initiatives fail, or their implementation is shallow and trivial (Basch, Sliepcevich, Gold, Duncan, & Kolbe, 1985). To reduce implementation failure, the evaluation uses *Prevention Plus III,* a workbook for program assessment published by the Center for Substance Abuse Prevention (Linney & Wandersman, 1991). The workbook contains a four-step model composed of identifying the program goals, processes, outcomes, and impacts. It includes worksheets that enable community groups to plan individual programs according to these four steps. In addition, *Prevention Plus III* provides examples of completed worksheets for popular community activities like Red Ribbon Days, parent education programs, and coping skills programs. The workbook also contains numerous evaluation instruments for program satisfaction, substance abuse awareness, attitudes, self-esteem, parenting skills, sense of community, and others.

In the evaluation of the Midlands Prevention Alliance, *Prevention Plus III* is used for several initiatives, such as stop-smoking programs for adults, mentoring programs for students at risk of low achievement, and employee assistance programs for businesses. Evaluation of these initiatives is directed at the organizational level in that *Prevention Plus III* emphasizes feedback to staff about the strengths and weaknesses of individual community initiatives to influence program improvement. The *Prevention Plus III* evaluation is further directed at the intrapersonal, community, and policy levels because changes at the levels are specified as outcomes of the coalition's initiatives. To illustrate, we assess whether adults quit smoking

as a result of a smoking-cessation program (an individual-level change), whether schools incorporate coalition-sponsored mentoring into their activities (a community change), and whether coalition initiatives persuade local businesses to use counseling options for employees with substance abuse problems (a policy change). One goal in using *Prevention Plus III* is to encourage interventions that are interconnected, for instance, whereby a smoking cessation initiative is supported by antitobacco policies like smoking bans in public places.

The *Prevention Plus III* evaluation focuses not only on increasing the coalition's readiness to implement programs but also on the staff's capacity to conduct its own evaluations. Project staff and funding agencies are usually very interested in evaluation of specific programs for accountability of funds as well as for determining program effectiveness. Did the program meet its goals? Was the target population reached? What changes can be instituted for program improvement? These questions can be answered by conducting a simple yet comprehensive evaluation of the program and *Prevention Plus III* is tailored to such a programmatic self-assessment. However, project staff usually are untrained in evaluation methods including design, analysis, and interpretation. Members of the evaluation team use a two-prong strategy to facilitate program evaluation of specific prevention programs. First, using *Prevention Plus III,* we conduct a comprehensive evaluation of one program within each county (for instance, smoking cessation, mentoring, or employee counseling) and work closely with the project staff on that evaluation. We meet with them to identify goals and objectives of the program. Very often, we need to reflect on the reasonableness of particular goals because staff frequently have an extremely optimistic view of the effectiveness of their programs. Over-optimism is even more likely to occur if staff focus on implementing short-term activities that occur once or twice a year. These activities, which are usually designed to increase awareness, have little long-lasting impact on individuals and their behavior. However, a significant amount of planning and development goes into these activities and it is understandable that project staff have high expectations. Questioning the reasonableness of goals has not been problematic with project staff, probably because of the collaborative nature of the staff–evaluator relationship. The assessment design and measures are shared with project staff prior to data collection, and timely feedback is provided to staff so that they can then use this feedback to refine future programs.

The second strategy we use to increase evaluation of specific prevention programs is to train staff and provide technical assistance to them in the evaluation of their programs. We train them in the use of *Prevention Plus III* by providing workshops which include specific examples and

exercises for them to do. The evaluation team encourages project staff to complete the four-step evaluation method outlined in *Prevention Plus III* for as many prevention programs as possible and staff are further encouraged by the evaluators to use the evaluation team for technical assistance. This increases staff confidence as well as skill level in the use of self-assessment methods. Hence, *Prevention Plus III* is used as an empowering tool that can demystify program evaluation for staff by presenting a comprehensive orientation to the basic steps of program evaluation (Fetterman, 1994; Linney & Wandersman, 1996). Project staff perceive benefits from this self-assessment method because they have documentation of their activity as well as data that can be shown to community volunteers, oversight committees, and funding agencies. Thus, the use of *Prevention Plus III* illustrates the application of social ecological assessment principles as it is applied not only for program evaluation but also as a capacity-building tool to enhance staff expertise and community support.

Policy Analysis Case Study

Policy development is a way for coalitions to create lasting changes that will continually influence the prevention of substance abuse and related risks. While much has been written about the policy process, little research has been directed at how to optimize successful policy development (Milio, 1988). To better understand the coalition's effect on policy development, the evaluation uses a case study method suggested by Milio that includes the following elements:

> what participants (organizational units) were involved; how (their positions on the policy questions as the policy developed); what resources and strategies they used; and their success in shaping the policy in their favor; . . . changes may occur in: participants' agendas and priorities (whether a participate is a committee, department, business or community group); the definition or scope of public policy problems; the criteria for choosing policy solutions (such as taking health or vulnerable groups into account). Are more or different interested parties involved in consultations on policy? (p. 269)

Much like the *Prevention Plus III* assessment, the case study informs the coalition about effective strategies for producing successful policy initiatives. Thus, the *Prevention Plus III* evaluations of specific programs, particularly those producing policy outcomes, are triangulated with policy case studies to increase implementation effectiveness. For instance, we mentioned previously that one partnership that we evaluate tried to influence businesses to adopt employee assistance programs for those with substance abuse problems. The program evaluation used *Prevention Plus*

III assessment tools which indicated that businesses were reticent, due to liability and cost, to adopt employee assistance programs. A policy case study based on Milio's suggestions could be helpful in better understanding these factors and could potentially influence the coalition's future interventions to develop employee assistance programs.

Phase 3: Impact

When coalition initiatives are well organized and delivered effectively, they should produce community-wide results that remain durable. This section explores the types of community-wide impacts that we assess and the assessment methods used.

Key Community Leaders as Bellwethers of Community Awareness, Concern, and Action

The Midlands Prevention Alliance's successful implementation of community initiatives should lead to an increase in community awareness, concern, and action regarding substance abuse, violence, HIV-AIDS, sexually transmitted diseases, and teen pregnancy. Consequently, the evaluation includes a Key Leader Survey to assess the levels of awareness, concern, and action of community leaders such as local elected/appointed officials and administrators of local health, social welfare, and educational organizations.

Key leaders may be distinguished from key informants in that the latter often are used as sources of data due to their knowledge of the subject under study. In the evaluation of the Midlands Prevention Alliance, key leaders are important because they direct local service organizations. Therefore, they operate at a pivotal level of the social ecology in that they influence public opinion, resource allocation, programming, and policy development (Wandersman et al., 1996). The evaluators hypothesize that where key leaders display significant increases in awareness, concern, and action, the community will experience a greater number of health promotive policies and programs. In this regard, the Key Leader Survey is as much an organizational-level measure as it is an intrapersonal one (see Table I). Organizational theorists commonly emphasize the central role the lead administrator plays in shaping and influencing the organizational culture by promoting organizational values, resolving ethical issues for the agency, invoking symbols, and managing environmental conditions both internal and external to the organization (Burns & Becker, 1988). The leader of the organization has the influence to translate high

levels of issue awareness, concern, and action into organizational responses. Therefore, increased involvement of community key leaders in the concerns of the coalition is a bellwether for coalition-influenced organizational and policy changes.

The survey includes items that reflect the key leaders' levels of awareness, concern, and action, as well as the leaders' perceptions of the organizations' concern with and involvement in programming directed at alcohol and other drugs. The questions asked of key leaders are directed mostly at the policy and organizational levels. For instance, leaders are asked if they have been involved in health promotive policy issues regarding substance abuse and whether they have influenced policy within their own organization as a result of the Midland Prevention Alliance's work. Also, intrapersonal measures are embedded in the survey to assess the key leaders' level of concern or commitment to the Alliance's work, because such commitment is a precursor to more meaningful involvement or action. The Key Leader Survey is administered as a baseline and posttest measure. A quasi-experimental design is employed since key leaders in comparison counties also receive the survey. The pre- and posttesting of key leaders is a form of time triangulation to indicate whether the leaders and their organizations develop greater awareness, concern, and, most important, action as a result of coalition initiatives.

Community Survey: Adult-Reported Use of Alcohol, Tobacco, and Other Drugs, and Attitudes Regarding Community

To further assess changes in community attitudes and behaviors, the evaluation team conducts a telephone survey on a random sample of adults in both intervention and comparison counties. The survey was developed by the Community Partnership Demonstration Project (Center for Substance Abuse Prevention, 1994). The survey measures operate at both the intrapersonal and community levels to underscore whether the coalition is producing a community impact on drug and alcohol use (see Table I). We noted earlier that many nationally developed community health surveys, such as the present survey, focus on the attitudes and behaviors of individuals. However, when we triangulate the adult survey with the data from the Key Leader Survey and trend data (discussed in the next section), a more complete picture emerges. For instance, the Key Leader Survey highlights whether important leaders have an impact on the policy and activities of local organizations. The community survey reflects the impact on local residents who may be recipients of these activities. If the Key Leader and community surveys produce positive results, then more

extensive and durable community impacts may be evident in the trend data, for instance, a decrease in alcohol, tobacco, and other drug-related arrests; in sales of alcohol and tobacco to minors; and in rates of teen violence. The evaluators compare the results from these three measures to see if such a pattern emerges.

Trend Analysis of Archival Data

The trend data are measures of community-wide impact. To develop trends, we use data that are reported in standardized data systems from the South Carolina's Departments of Alcohol and Other Drug Abuse Services, Education, and Health and Environmental Control. Examples of trend indicators supplied by these agencies include the incidence of intake into treatment programs, substance abuse-related seizures and arrests, per capita liquor sales and licenses issued, substance abuse-related deaths, rates of adolescent substance use, and blood alcohol levels of pedestrians and drivers in fatal accidents. These measures are community-level indicators because they are aggregated data that reflect social changes across the entire community. In analyzing trend data, the evaluators employ a multiple time series design (Veney & Kaluzny, 1991; Windsor, Baranowski, Clark, & Cutter, 1994). This means that trends are examined over time to explore whether they have changed in the desired direction after the implementation of the coalition's community-wide initiatives. To increase internal validity, the trends from the coalition counties are contrasted with those from comparison counties. Trend analysis is a form of time triangulation, as trends are compared prior to the implementation of the coalition's community initiatives with trends that occur after implementation is under way. In all, the key leader survey, community survey, and trend measures reflect the transition from the Phase 2 concern for effective programming to the Phase 3 concern for the Midlands Prevention Alliance's impact on community health status.

Institutionalization of the Midlands Prevention Alliance and Its Initiatives

The complex health issues that many coalitions confront demand concerted and long-range efforts. Therefore, successful activities and programs may need to be repeated and sustained. This requires the institutionalization of health initiatives across all strata of the social ecology. Institutionalization has been defined alternatively as increasing community and practitioner competence in addressing health promotion issues (Eng

& Young, 1992; Green, 1989), and as developing community and organizational supports for health promotion programs so that they remain viable in the long term (Goodman & Steckler, 1987). During the Phase 3 evaluation, institutionalization is operationalized in two ways. First, the evaluation concentrates on community-wide impact as an indicator that the Alliance has been effective in institutionalizing changes in the community's health status. Second, the evaluation examines the likelihood that the Alliance and its initiatives will endure after funding from the Center for Substance Abuse Prevention terminates.

To measure the permanence of coalition initiatives, the evaluation uses the Level of Institutionalization Scale which appears elsewhere in the literature along with its factor structure and loadings (Goodman, McLeroy, Steckler, & Hoyle, 1993). The scale is based on the work of Katz and Kahn (1978) who observed that organizations comprise subsystems for production, maintenance, support, and management. The scale reflects the extent to which a program becomes built into the subsystems of their host organizations. To aid practitioners, Goodman et al. (1993) have taken the concepts from the Level of Institutionalization Scale and have developed a checklist for those who wish to assess the extent to which a program is institutionalized in an organization. The checklist, which can be used after a program has been initiated and operated once or twice, suggests areas where additional resources, interventions, or other efforts are necessary for program institutionalization to occur. Thus, the institutionalization scale is used at the organizational level to diagnose the level of permanence of coalition initiatives and to suggest possible strategies to increase their institutionalization potential. To assess the permanence of the Midlands Prevention Alliance, the evaluators administer the institutionalization scale to project staff and local agency administrators. The results then are used in group problem-solving sessions to refine strategies for increasing the coalition's prospects for permanence. Thus, the Level of Institutionalization Scale facilitates the coalition's ultimate stages of readiness: refinement and institutionalization.

DISCUSSION AND CONCLUSIONS

We proposed that ecological assessments must focus on more than individual behavior and also consider larger social levels and stages of community readiness. The assessment of the Midlands Prevention Alliance illustrates how these levels and stages are incorporated into the evaluation design of a complex community initiative. Triangulation of method, time, and space are important aspects of the present assessment.

Cordray (1986) wrote that the relatively high incidence of technically poor evaluations may largely be attributed to placing too much faith in social science methods, particularly quasi-experimental designs, in light of the complexity of social programs. The Alliance is one example of a complex initiative in which quasi-experimentalism alone is inadequate to determine whether and why the coalition influenced important changes in social norms, patterns of organization, and behavior. Cordray suggested that quasi-experimental approaches must be rectified by enhancing method and sharpening judgment. According to Cordray, enhanced methods consist of "a data acquisition plan and the synthesis or combination of evidence into a coherent set of results . . . by piecing together numerous bits of information accumulated by multiple methods" (p. 11). Sharpened judgment is a question of (a) assuring the strength and fidelity of the intervention; (b) specifying the program model, underlying theory, and particulars of the setting; and (c) combining assessments of contiguity, or whether cause and effect are coupled in time and space, and congruity, or the relationship between the strength of the intervention and the magnitude of the effect. The ecological orientation of the present evaluation design attempts to meet both methodological and judgment criteria.

Table I indicates that the data acquisition plan for the present evaluation is clearly articulated and methodologically suited to an ecological assessment of a complex program. Through triangulation, the plan pieces together numerous bits of data by which judgments of intervention effectiveness can be formed. In the present example, triangulation is an important component of an ecological assessment because it allows for a rich depiction of complex social systems (Denzin, 1978). The present evaluation illustrates that triangulation occurs across several planes. First, at each phase of the coalition's development, the evaluation methods are triangulated across different levels of the ecology. Second, the evaluation triangulates measures across different phases of coalition development and stages of readiness. Third, multiple evaluation methods are employed within each level and phase to explore whether triangulated methods produce convergent results.

Triangulation sets the basis for the second criteria suggested by Cordray (1986), judgment of program effects. First, the evaluation of the Midlands Prevention Alliance assures the strength and fidelity of the intervention by using Forecast, a system developed explicitly to assure fidelity. Also, by employing *Prevention Plus III,* the evaluators measure the strength of implementation of individual coalition initiatives. Moreover, both Forecast and *Prevention Plus III* are capacity generating by concentrating on increasing staff and volunteer expertise in organizing the coalition (fidelity) and doing self-evaluation (strength). The evaluators also provide training

in needs assessment and plan development. Thus, the evaluation builds strength for the intervention by facilitating a collaborative working relationship between evaluators and the project. Second, the Forecast evaluation specifies the program model, underlying theory, and particulars of the setting by developing diagrams that represent the nature of the problem and methods for intervening. Third, the evaluation combines assessments of contiguity, or whether cause and effect are coupled in time and space, and congruity, or the relationship between the strength of the intervention and the magnitude of the effect. Contiguity is accomplished by using comparison groups for the Key Leader Survey, the community survey, and trend data, to rule out competing explanations for the results produced by Alliance initiatives. Congruity is evidenced by the "Tracking of Actions" logs of the coalition's level of effort which are tallied month to month so that trends can be assessed over time in relationship to the outcomes produced. Congruity also includes measures of institutionalization of programs and the coalition to assure that the interventions will continue over the long term to produce maximum effect.

Clearly, our approach to evaluation is "hands on." We believe that the purpose of evaluation of complex community initiatives is to facilitate their improvement and effectiveness. Hence, we try to influence the direction that coalition initiatives take by constant and ongoing interaction with project participants. A possible cost of such an intensive evaluation is that the evaluators might overdirect and unduly influence the coalition, thus stifling innovation. Our intent is to act as a mirror that reflects the coalition's actions back to its members. For example, the model of the project intervention produced by the Forecast evaluation is based on the concepts and procedures that the Midlands Prevention Alliance included in its grant application. The Forecast System uses the Alliance's proposed concepts and procedures as the basis for evaluating project formation. Rather than stifling innovation, this approach to evaluation helps the Alliance consider how the strategies it developed are effective and how they may need to improve. In general, we stress to Alliance members that the best ways in which we can be helpful are by being dedicated to an ongoing relationship with the coalition and by providing honest feedback that is based on data, open sharing of information, problem solving, negotiation, good will, and support of the coalition's efforts. While the coalitions that we evaluate do not always agree with our approaches, conclusions, or recommendations, they view us as valued members who provide important feedback. Without earning the trust of our community coalitions through open communication, negotiation, and compromise, we do not believe that our assessment approach is feasible.

In conclusion, the evaluation of the Midlands Prevention Alliance fits the principles of ecological assessment in several important ways, but the two most important facets include the conceptualization of interventions (a) as occurring across multiple social levels, thereby requiring multiple methods of evaluation; (b) as occurring across stages of development, thereby requiring the focus of the evaluation to shift across stages. A third element, the triangulation of methods across and within levels and stages, enables the evaluators to develop a richer understanding of an elaborate community initiative. Certainly, ecological assessments are complex but they are necessary to capture a rich picture of pressing social concerns and the multilevel interventions that are designed to address them.

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