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COMMUNITY PREVENTION OF ALCOHOL PROBLEMS

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Abstract — Local communities have begun using policy to affect the drinking *environment* itself as an approach to reducing alcohol involved trauma. That is, policy is used to produce structural changes in the drinking environment. In turn, changes in the environment effect changes in drinking behavior. This paper describes an effort in three communities in two states to reduce alcohol problems at the community level, "Preventing Alcohol Trauma: A Community Trial." This trial was a 5-year research project with a goal to reduce local alcohol-involved injuries and deaths in three experimental communities with populations of approximately 100,000 each (one in northern California, one in southern California, and one in South Carolina). The communities contained racial and ethnic diversity as well as a mix of urban, suburban, and rural settings. Each of these three communities had a control community that did not receive the prevention interventions. The project used an environmental policy approach to prevention and five mutually reinforcing components were implemented: (1) community mobilization to develop community organization and support, (2) responsible beverage service to establish standards for servers and owners/ managers of on-premise alcohol outlets to reduce their risk of having intoxicated and/or underage customers in bars and restaurants, (3) a drinking and driving component to increase local drunk-driving enforcement efficiency and to increase the actual and perceived risk that drinking drivers would be detected, (4) an underage drinking component to reduce retail availability of alcohol to minors, and (5) an alcohol access component to use local zoning powers and other municipal controls of outlet numbers and density to reduce availability of alcohol. Results show that the project reduced alcohol-involved crashes, lowered sales to minors, increased the responsible alcohol serving practices of bars and restaurants, and increased community support and awareness of alcohol problems. © 2000 Elsevier Science Ltd.

Key Words. Alcohol problems, Prevention, Community action, Policy.

BACKGROUND

Most community disease prevention or health promotion trials have been directed toward either high-risk subsets of the population and carried out in clinical settings or in work sites, or they have been directed at entire populations in communities and have involved some combination of community organization and health education. Community efforts to prevent chronic diseases have yielded years of experience, notably those from cardiovascular disease (CVD) and lung cancer (Carlaw, Mittlemark, Bracht, & Luepker, 1984; Farquhar et al., 1990; *American Journal of Public Health*, 1995).

However, one cannot assume that medical trials are automatically relevant to designing and managing alcohol prevention programs just because most knowledge of community-based public health interventions derives from programs to reduce high-risk medical conditions (see Hennessy, 1991). The acute effects of alcohol in producing alcohol problems are more closely linked in time and space to the consumption of

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alcohol than are the dietary patterns associated with CVD, the chronic disease expression. Norms associated with drinking differ dramatically from those associated with problematic dietary patterns.

The rationale for targeting communities, as opposed to individuals, is compelling. First, substance use occurs largely within community contexts. That is, particularly in the case of alcohol, communities provide structures (e.g., zoning of alcohol establishments) through which alcohol is typically obtained. Second, many of the costs associated with alcohol are borne collectively at the community level in the form of car crashes and alcohol-related violence.

A fundamental distinction may be made between the manner in which traditional and environmental approaches conceptualize communities. Specifically, traditional approaches view communities as catchment areas while environmental approaches view communities as systems. From the catchment area perspective, the community is viewed largely as a collection of target groups with adverse behaviors and associated risks. Prevention operates largely through educational efforts to reduce the demand for alcohol. The strategy is thus to find and treat or serve those most at risk. No particular structural change is proposed and those outside the targeted groups are left unaffected. There is limited evidence of the potential effectiveness of individual-focused programs to reduce alcohol problems as long as the existing social, economic, and cultural structures remain unchanged. Therefore, because the structures remain unchanged, even if the targeted program is effective, new cases will be generated by the community system.

As an alternative, Holder (1998) has proposed a systems approach to the reduction of alcohol problems that operates by changing the community structures that provide the context in which alcohol consumption occurs. Such supply-oriented approaches may provide advantages over demand approaches in that they do not require the identification of at-risk individuals, or even their active cooperation. Moreover, since most alcohol-related problems do not involve alcoholics, this approach may be particularly effective in the case of alcohol. Here the view is that the problem is created by the system rather than by problem individuals. Thus, rather than attempt to reduce alcohol-related problems through the education and treatment of problem drinkers, efforts may be directed toward affecting policy makers in positions to implement zoning restrictions governing outlet densities. More broadly, collective risk is thus reduced through interventions affecting community processes that influence alcohol use.

COMMUNITY POLICY AS A PREVENTION STRATEGY

Programs such as media campaigns, alcoholism recovery efforts, and school educational efforts have long been popular prevention strategies in communities, while local efforts that seek to alter the entire community system using public policy have a relatively brief history. For the most part, local prevention strategies have been programs that target individual problem drinkers, not the total community. Results from evaluations of these individual-focused strategies have not been particularly encouraging (see Casswell, 1995). While many community-based efforts have emphasized education and training to modify individual drinkers' behavior without changing structural features of the community (see summary in Casswell, 1995), some communities have developed community-wide environmental strategies to address alcohol problems.

Local communities have begun to alter the drinking *environment* itself as an approach to reducing alcohol-involved problems (see Casswell, Gilmore, Maguire, & Ransom, 1989; Holder, 1999). That is, local policy is used to produce structural changes in the drinking environment. In turn, changes in the environment effect changes in drinking behavior. In many cases, national as well as state or provincial laws establish the base for local policies, including legal drinking age, regulation of alcohol outlets, the legal blood alcohol level for drinking and driving, advertising restrictions, and service to obviously intoxicated persons and underage persons. Local policies often address the implementation and enforcement of these existing laws.

Local policy efforts differ from more traditional approaches in that they seek to bring about system-level change in the total community, use the media to target policy makers, and seek to mobilize the broader community to pursue desired changes. While such alternative approaches appear promising, only recently have there been systematic attempts to evaluate such efforts (Holder et al., 1997).

A policy is any established process, priority, or structure that is purposefully sustained over time. Thus, alcohol policy, at whatever level it is implemented, is an environmental or structural response to alcohol problems. At the local level, policy makers can establish the priorities for community action to reduce risky behavior involving drinking, which, in turn, can reduce the number of alcohol-involved problems. For example, local alcohol policies can include (1) making a priority of drinking and driving enforcement by the local police, (2) mandating server training for bars, pubs, and restaurants, (3) setting a written policy for responsible alcoholic beverage service by a retail licensed establishment, or (4) allocating enforcement resources to prevent alcohol sales to underage persons.

In federated nations such as Canada, the United States, India, and Brazil, control of alcohol availability is in the hands of states or provinces. Thus, control is removed from the sites in which alcohol problems actually occur, that is, in local communities. Regional policies (i.e., those set at a national level) are often inherently limited as to the types of restrictions and priorities that can be applied to alcohol problems. In contrast, communities have opportunities (many often unrecognized or unexplored) not available at the national or regional level. Existing national and state or provincial laws provide the legal basis for many local policies and can enable local communities to prioritize use of existing resources within legal frameworks to achieve specific objectives.

The potential for prevention policy at the local level can be seen in the successful approaches tested in Australia, New Zealand, the United States, and Canada. In these countries, national alcohol policies are much less extensive than those historically employed in the Nordic countries. Thus, there is much potential for more locally based strategies that do not depend upon national policy, and there is increased demand for local initiatives to prevent alcohol problems (see Casswell, 2000; Holder et al., 1997). The opportunity for alcohol policy organized at the local level has never been greater (see discussion of policy formation by Hawks, Stockwell, & Casswell, 1993).

EXAMPLES OF PRIOR COMMUNITY ACTION PROJECTS FOR ALCOHOL PROBLEM PREVENTION

There are numerous examples of prior use of community action to develop local policy as a means to reduce alcohol problems. In San Francisco in the early 1980s, researchers worked with representatives of local agencies and interest groups to increase leaders' awareness of alcohol problems and to stimulate local policy (see Wallack,

1984–85). A New Zealand project initiated in the mid-1980s emphasized both mass media and community organization in support of alcohol policy changes (Casswell & Gilmore, 1989). Relative to comparison communities, the results from experimental communities have been interpreted as suggesting that project efforts prevented further liberalization of attitudes toward alcohol. A number of factors not directly related to policy were also considered. In general, the studies found an increased public acceptance of policy in the intensive intervention sites. Subsequent evaluation also found that mass media and community organization programs in local communities could be used to increase support for environmentally based interventions (Casswell et al., 1989). A community prevention trial implemented in Woonsocket, Rhode Island was based on the "Community Gatekeeper Model" (Stout, 1992). The study found that the intervention produced increased knowledge about alcohol-related injury, changed attitudes toward enabling drinking, and had modest effects on a decrease in emergency room cases (see Stout, 1992, 1994).

A Western Australian project (Boots & Midford, 1999; Harrison & Laughlin, 1993; Midford, James, Oddy, Dyskin, & Beel, 1995) was designed to reduce alcohol-involved injuries. While this project did find increased community support and interest in injury prevention, the results from a number of time-series analyses (ARIMA) were not as encouraging. These included time-series data about wholesale alcohol sales, assaults, traffic crashes, and hospital morbidity weighted to reflect likely association with alcohol. These analyses failed to demonstrate an impact. Specifically, alcohol consumption remained relatively flat, as did most harm indicators. Although one harm indicator approached, but did not attain significance, it is not known whether a longer time-series would demonstrate an effect.

Hingson et al. (1996) described the results of a six-community effort in Massachusetts ("Saving Lives") to reduce alcohol-involved driving crashes and deaths. The community interventions produced a 25% reduction in fatal crashes, and fatal crashes involving alcohol decreased 42%, comparing 5 years before and the 5 years of the program. A six-county community project in northeast Minnesota (USA) was designed to prevent or reduce alcohol use among young adolescents using a multilevel, community-wide approach. At the end of 3 years, students in the intervention school districts reported less initiation of drinking and prevalence of alcohol use than students from reference districts, who served as controls (Perry et al., 1996).

Holmila (1997) conducted a project in Lahti, Finland composed of multiple prevention components, including local approaches to alcohol policy to increase key leaders' perception of alcohol as a social problem. The project increased local newspaper attention to alcohol issues, public perception of alcohol as a social problem, and knowledge of alcohol content and the limits for risky drinking. Overall, however, Holmila and Simpura (1997) concluded that there were no clear changes in drinking patterns or problem drinking that could be attributed to the Lahti project (Holmila, 1997).

The Communities Mobilizing for Change on Alcohol (CMCA) project was designed to reduce the flow of alcohol to youth under age 21. The project identified five core components: (1) influences on community policies and practices, (2) community policies, (3) youth alcohol access, (4) youth alcohol consumption, and subsequently (5) youth alcohol problems. Although the project was clearly community-wide in terms of the community institutions involved, the project was focused on one particular target group, youth. Fifteen communities (defined by school districts with at least 200 students in the ninth grade, students were drawn from no more than three municipalities) in Minnesota and

western Wisconsin were recruited before randomization was used to determine which would be the intervention communities and the comparison group. Pairs of communities (along with one group of three, due to there being an odd number of communities) were chosen matched on their size, state, proximity to a college or university, and baseline data from an alcohol purchase survey. One member community of each pair was then selected to be the intervention site when the time came to begin the community organizing. In the end, there were seven intervention and eight comparison sites ranging in size from approximately 8,000 to 65,000 residents, with an average of about 20,000.

The community interventions included: (1) decoy operations with alcohol outlets (in which police typically have underage buyers purchase alcohol at selected outlets), (2) citizen monitoring of outlets selling to youth, (3) keg registration (which requires that purchasers of kegs of alcohol provide identifying information thus establishing liability for resulting problems at parties where minors are drinking), (4) developing alcohol-free events for youth, (5) shortening hours of sale for alcohol, (6) responsible beverage service training, and (7) developing educational programs for youth and adults.

Evaluation data were collected at baseline and again about 2 1/2 years after beginning the intervention. These data included surveys of 9th and 12th-grade students at baseline, 12th graders at follow-up, telephone surveys of 18–20-year-olds, surveys of alcoholic beverage merchants, and a survey of outlets using 21-year-old women who appeared to be younger to see if they would be sold or served alcohol without having identification. Other data sources included monitoring of mass media and process-oriented data, both qualitative and quantitative, to capture how the intervention moved ahead and the obstacles staff and communities faced in reaching their objectives.

Merchant survey data revealed that they increased checking for age identification, reduced their likelihood of sales to minors, and reported more care in controlling sales to youth (Wagenaar et al., 1999). The telephone survey of 18–20-year-olds showed lower frequency of providing alcohol to minors and a lower likelihood of buying and consuming alcoholic beverages. Unfortunately, these results were not statistically significant, although all the indicators were consistently in the direction of predicted effect and were consistent across all seven of the intervention sites.

Other international examples of community action projects designed to prevent alcohol problems in Canada (Giesbrecht & Pederson, 1992), and Sweden (Romelsjö, Andren, & Borg, 1993) have been described.

PREVENTION RESEARCH CENTER'S COMMUNITY TRIALS PROJECT

The Community Trials Project (Holder et al., 1997) was a five-component community trial conducted in three experimental communities matched to three comparison sites. The objective of the project was to determine, through an *efficacy trial*, whether a comprehensive series of interventions could produce a statistically significant reduction in alcohol-involved injuries and death.

The Community Trials Project was based upon a public health environmental approach to prevention. The primary strategy of this trial was to make structural changes in each community that reduce the use of alcohol in conjunction with risky activities and situations that could lead to unintentional injury and death. The operating philosophy of the project was to assist each experimental community to make effective, long-term changes to reduce alcohol-involved injuries and death, not to change indi-

vidual drinking patterns per se. This project tested the efficacy of alcohol policy strategies at the local level (see Edwards et al., 1994).

To achieve the goal of reducing overall alcohol-involved trauma, the Community Trials Project implemented and evaluated five broad types of prevention activities, referred to here as components. Each component addressed some aspect of the conceptual model, had its own set of prevention activities, and was designed to be mutually reinforcing with other components. Each of the five prevention components had been tested in other communities, but never together within a comprehensive program designed to achieve mutual reinforcement or synergy. While each component had its own goals and objectives, this efficacy trial was designed to obtain as much mutual reinforcement across all components as possible.

The study was designed to reduce as many threats to internal validity (claims of attribution of causation to the prevention program and not some other exogenous process) as possible. Process evaluations provided information about relative contributions of various strategies that can guide future community prevention trials. If the comprehensive, multiple strategies yielded a significant effect, then treatment effectiveness trials can be undertaken later to identify the most efficient and effective combinations of these prevention strategies.

As an efficacy prevention trial, this study did not "randomly" assign intervention sites to treatment conditions. Rather, communities were purposely chosen as experimental sites if they had existing coalitions that were interested in the proposed comprehensive strategies and if they also had sufficient population (approximately 100,000 persons) to provide adequate statistical power for evaluation of outcomes. These communities did not experience high or above-average alcohol problems. Comparison sites were matched to the intervention sites on the basis of similar local geographic area characteristics (e.g., within the same state and region), industrial/agricultural bases, and proportions of the population classified as minority. Three community pairs (experimental and control) were selected. The cities had populations of approximately 100,000 each and were located in northern California, southern California, and South Carolina, in the United States.

The northern California experimental site was located inland from Monterey Bay. The comparison site was located 90 miles from San Francisco in the northern part of the San Joaquin Valley. Both sites are commercial and agricultural centers with a Spanish-speaking population between 40–50%. The southern California experimental site was located 35 miles north of San Diego, in San Diego County, while its comparison city is 30 miles southeast of Los Angeles. Both are nonmanufacturing, nonagricultural communities with diverse light industry, tourism, and office centers, and both have a significant (over 20%) Mexican-American population.

The South Carolina experimental site was in the northeastern part of South Carolina in the Great Pee Dee River area. Its comparison community was located in east central South Carolina. Both communities are moving away from their former agricultural-textile manufacturing base to light and medium industry, manufacturing, and retail trade. Both sites have significant African-American populations (approximately 40%) actively involved in current local alcohol prevention activities.

Community mobilization

The Community Knowledge, Values, and Mobilization component involved working with existing community coalitions and task forces to prepare for implementation

of specific alcohol problem prevention strategies, to develop public awareness focusing on alcohol-involved trauma and the relationship of drinking impairment to increased risk of death or injury, and to increase awareness of the individual component activities. Local news media and public information activities were used to support the overall goals of the project as well as those of individual components. Project organizers worked with existing community coalitions to implement specific alcohol problem prevention activities and to develop a public awareness and concern about alcohol-involved trauma and the increased risk of death or injury associated with drinking. Public communication via media advocacy supported the overall goals of the project as well as those of individual components.

Responsible beverage service

The goal of the Responsible Beverage Service component was to reduce the likelihood of customer intoxication at licensed on-premise establishments through responsible beverage service practices, and to prevent already intoxicated patrons from driving or engaging in other risky behavior while impaired. The primary objective was to change the serving practices among on-premise alcohol licensees with emphasis on the manager's responsibility. Other targets for this component included professional hospitality associations (restaurant, bar, and hotel associations) and beverage wholesalers, to help gain their acceptance of the prevention program; Alcohol Beverage Control officers and local law enforcement officials, in order to increase enforcement of existing laws and to develop incentives for compliance; and voluntary associations related to alcohol and drunk driving (e.g., Alcoholics Anonymous, Mothers Against Drunk Driving), to bring attention to the role of outlets in problem reduction.

Drinking and driving

The goal of this component was to reduce the number of drinking and driving events by increasing both the actual and perceived risk of detection for driving while intoxicated (DWI). This component also increased DWI efficiency by training enforcement officers in new techniques for identifying DWI drivers and the use of passive alcohol sensors to increase the probability of detection. This component also provided an environment that empowered significant others and retail establishments to intervene in order to prevent drunk driving.

Underage drinking

The goal of this component was to reduce drinking among underage youth. Underage Drinking included community programs focusing on reducing sales and access to alcohol by minors, training off-premise alcohol retailers to prevent sale of alcoholic beverages to minors, and increased efforts to enforce underage sales laws. The goal of this component was to reduce sales and access to alcohol as a means to decrease adolescent drinking, drinking in conjunction with driving and other high-risk situations, and riding with drinking drivers. Three basic interventions were used: (1) enforcement of underage alcohol sales laws, (2) training of off-premise clerks, owners, and managers to prevent sale of alcohol to underage persons, and (3) media advocacy to bring news attention to the issue of underage drinking and easy retail access to alcohol by minors.

Alcohol access

The goal of this component was to assist communities in increasing restrictions on access to alcohol, thereby reducing alcohol-involved trauma. Local zoning powers and

other municipal controls of outlet density were used to reduce the availability of alcohol that is related to alcohol-involved trauma. For example, such restrictions can affect alcohol outlet densities by preventing the establishment of new outlets. Local authorities can change the behavior of outlets by more closely monitoring existing outlets for compliance with Alcoholic Beverage Control (ABC) regulations. Over time, these regulations can alter forms of alcohol consumption that are dangerous to the community and reduce heavier alcohol consumption, alcohol-involved traffic crashes, and nontraffic trauma. Changes in locations of outlets were considered a change in access, though they may not reflect a decrease in total access of alcohol in the community.

A discussion of the conceptual model that identified the antecedents for these components and the rationale for the aggregate problem indicators used in this project can be found in Holder et al. (1997). This study had five phases over 5 years, 1991–1996. The intent of the Community Trials Project was to encourage support and reinforcement between and among the five prevention components, creating synergy. There were elements of each component that interacted with each of the other components in a two-way supportive relationship.

EVALUATION DESIGN

The evaluation of the Community Prevention Trial can be categorized as either: (1) outcome measures, or (2) process measures. Outcomes, the ultimate measures of success for any community project, were the indicators or counts of alcohol-involved problems at the community level, no matter their source. The outcomes were not counts of problems within a target group, but rather problems (i.e., alcohol-involved trauma) that arose from the overall community structure. A distinction was made in this project between "process" and outcome variables. Measures of program effectiveness (e.g., reductions in outlets due to planning and zoning activities) were distinguished from measures of intervention effectiveness (e.g., reductions in alcohol-related crashes attributable to the Community Trial intervention). It is important to distinguish between intervention components that fail in the "process" of implementation from those that fail because the implementation itself is ineffective. The latter would be shown to be the case if, given effective implementation of the intervention program demonstrated by increased refusals of service to intoxicated persons, average blood alcohol content (BAC) levels of drivers at roadside coming from on-premise establishments remained constant.

PROCESS EVALUATION

The success of the Community Trial relied heavily on the ability of community coalitions to mobilize key organizations (e.g., schools, law enforcement, health care agencies) to support and promote the goals of the project. Based on the goals and strategy of this trial, there were six specific aims of the process evaluation (1) to monitor implementation to identify problems in the design and implementation, (2) to train and engage coalition members to participate, (3) to provide feedback to the community through the coalition, (4) to determine the extent to which the community builds capacity to prevent alcohol-related trauma and the components of the intervention become institutionalized, (5) to understand how communities become activated and es-

tablish health promotion programs, and (6) to monitor new research inputs/outputs associated with program implementation and continuation.

There were two features of the process evaluations that deserve mention. First, without the process evaluation the levels of implementation would be undocumented. Second, the process evaluation served as the only mechanism for qualitative evaluation of the progress of the interventions and thus also provided quantitative measures of level of implementation over time in modeling of Trial effects (Gruenewald, 1997).

INTERMEDIATE MEASURES

The intermediate measures provide a means of tracking targeted behaviors such as drinking and driving, youthful drinking, general alcohol availability, and consumption in the target and comparison communities. Because these measures may be impacted by several of the components they cannot be used for component-specific evaluations. They do serve as important bridges between component-specific implementation measures and the outcome data. Measures of intermediate variables also provide quantitative data that can be used in time-series analyses of Community Trial outcomes.

RESULTS: EFFECTIVENESS OF COMPONENTS

Community mobilization and its evaluation was based upon a conceptual model and implemented by local staff working through community coalitions and task forces. The goal was to bring about community awareness of alcohol-related injury and generate support for project interventions among key community leaders. In the experimental communities local staff and community coalitions were trained in this project design and in media advocacy or techniques for the purposeful use of local news to support policy. Technical assistance was provided throughout the project. By late 1992, coalitions had adopted the project design. Local staff then worked with existing community organizations and agencies (e.g., local police, alcohol beverage servers, and local government) in pursuit of the desired policy changes. As a result of these efforts, policy initiatives were implemented for each of the components in each of the experimental communities.

Community mobilization, process evaluation outcomes

The research base provided legitimacy and a focus for community efforts. However, coalition meetings were sometimes diverted by groups using their pre-existing agendas to oppose implementation of prevention efforts. We discovered that considerable support existed in the community for program interventions and, perhaps because of this broad support, key leader participation was present from the early stages. Existing community conditions at times provided unanticipated opportunities to galvanize public opinion, resulting in community action. Finally, local media not only influenced public opinion and community leaders but also served as a lightning rod for enthusiasm and provided local staff and project participants with a sense of efficacy and the potential for change.

Community training in techniques for working with local news media led to a statistically significant increase in coverage of alcohol issues in local newspapers and on local TV in the experimental communities over their matched comparison communities. Analysis of time-series data from 1992–96 found a statistically significant effect on local newspaper coverage of alcohol issues in the experimental communities, but not the comparison communities, that could be attributed to the media advocacy activities of

Table 1. Adopting formal policies to refuse service to intoxicated patrons experimental vs. control communities—mean intervention score*

	Northern California		Southern California		South Carolina	
	Experimental	Comparison	Experimental	Comparison	Experimental	Comparison
Pre (1993)	.16	−.14	−.17	.15	.17	−.21
Post (1995)	.20	−.21	−.11	.11	.12	−.11
Post (1996)	.21	−.18	−.15	.16	.08	−.07

*Mean intervention score was standardized within community pairs each year.

the project. Increased media coverage was important to gain leaders' support of specific alcohol policies and to increase public awareness of drinking and driving enforcement. There was increased adoption of responsible alcohol serving policies in the experimental communities over the comparison communities (see Table 1) as shown in the pre- and posttest reports by bar and restaurant managers. The experimental communities showed greater evidence of policy adoption than the comparison communities. There were limited but promising results in reducing alcohol service to heavy-drinking patrons. Such reductions in service may require longer follow-up than was possible at this time. The effect of the alcohol access component will require much longer follow-up to determine if there has been a reduction in the density of alcohol outlets that could lead to a reduction in heavy, high-risk drinking (see Saltz & Stanghetta, 1997).

There was a significant reduction in alcohol sales to minors (see Table 2). Overall, off-premise outlets in experimental communities were half as likely to sell alcohol to minors as in the comparison sites (logistic regression modeling, $\chi^2(1) = 48.89$, $p < 0.001$). This was the joint result of special training of clerks and managers to conduct age identification checks, the development of effective off-premise outlet policies, and, especially, the threat of enforcement of lawsuits against sales to minors (see Grube, 1997).

It is too early to determine the effects on high-risk drinking and outlet density resulting from the Alcohol Access Component. At this stage, only the level of implementation of local policies can be described. Two of the three city councils that discussed local alcohol access adopted policies that affected retail availability. The community coalition from the third community is still developing a written plan for alcohol outlets to be presented to the city council. These policies included requirements for training of alcohol servers, reductions of alcohol on- and off-premise outlets, and review and approval processes for license applications. At least one community actually denied a new license application that would have increased the density in a minority neighborhood. In all three communities, there was increased police enforcement of

Table 2. Percentage of off-premise alcohol outlets selling alcohol to apparent underage buyers experimental vs. comparison communities

	All Communities		
	Comparison	Experimental (Enforcement with No Training)	Experimental (Training Only)
Pre (1995)	47%	53%	45%
Post (1996)	35%	19%	16%

alcohol sales and alcohol service, especially targeting sales to underage persons and to intoxicated patrons.

A statistically significant reduction in traffic crashes was found comparing experimental communities with their matched comparison communities. The introduction of special and highly visible drink and drive enforcement—with new equipment and special training—produced the significant reduction. Key support came from increased news coverage (see Table 3). An estimate of prevented crashes can be derived by assuming that each experimental site is its own best control, by comparing expected future rates of single-vehicle nighttime (SVN) crashes against expectations from a no-intervention model, and by assuming that the results from the matched comparison sites represent the future expectations of experimental units. The first assumption generates an expected number of crashes for each experimental site based on projections from the past only. The second assumption generates an expected number of crashes for each experimental site based on projections from matched comparison sites. The overall reduction in alcohol-involved traffic crashes was 78 crashes over a 28-month intervention period from September 1993 through December 1995 (see Voas, Holder, & Gruenewald, 1997). This represents an approximate annual reduction in alcohol-involved crashes of 10%.

The combination of increased enforcement of laws against drinking and driving and increased media coverage of that enforcement has been linked to an increase of perceived risk of arrest for drinking and driving, which in turn is related to a decrease in drinking and driving and subsequent automobile crashes (Voas et al., 1997). Merchant training, enforcement, and media advocacy in their support when used in combination are effective in reducing underage purchases (Grube, 1997). Similarly, training and enforcement appear to be promising in terms of the reduction of service to intoxicated patrons (Saltz & Stanghetta, 1997). Finally, a decrease in alcohol outlet densities has been linked to a decrease in automobile crashes (Gruenewald & Johnson, 1999), suggesting that community efforts to limit such densities may produce desired outcomes in terms of crashes and resulting injuries and deaths. Overall, the Community Trials Project demonstrated that an environmentally directed approach to prevention, using policies as the form of intervention, does reduce alcohol problems at the local level.

COST EFFECTIVENESS AND COMMUNITY PREVENTION: PRELIMINARY ESTIMATES

There is a strong need for cost effectiveness analyses in prevention for the same reasons for examining the cost/effects of alcoholism treatment (see Godfrey, 1994; God-

Table 3. Single-vehicle nighttime crashes: Experimental vs. comparison communities using SURE models, 1992–1995, monthly

	Experimental		Comparison		
	t	*p*	*t*	*p*	
DUI checkpoints	0.187	0.851	−1.648	0.099	$\Delta G^2 = 0.0178$
Breathalyzers in field by police	−1.312	0.189	2.062	0.038	$p = 0.018$ $\Delta df = 3$
Drinking & driving news	−1.985	0.057	0.214	0.830	

$n = 6$ units; $t = 15$ quarters; SURE = Seemingly Unrelated Regressions; DUI = Driving Under the Influence.

frey & Maynard, 1995; Levy & Miller, 1995). At this time, the distal effects of only the drinking and driving component are known. Across the three experimental communities over the first 4 years of the project there was a net reduction of 78 alcohol-involved traffic crashes (Voas et al., 1997).

In the Community Trials Project, the staffing costs over 4 years were $1,080,000 ($360,000 times three experimental communities). This included the costs for implementation of all components. Using an average cost of $39,905 per crash (an estimate based upon medical, legal, and insurance costs as well as lost wages during rehabilitation, but not lost productive years due to early death) the savings from the 78 fewer alcohol-involved traffic crashes in the three experimental communities (relative to their matched comparison communities) was $3,112,590 ($39,905 per crash times 78 crashes). If we subtract the cost of the intervention across all three communities, we get a net total savings of $2,032,590. Thus, every dollar invested in the Community Trials Project returned $2.88 in savings, just from reduced traffic crashes alone. It should be noted that the estimate of implementation costs include all the other components, and we don't as yet have any estimates of their returns on this investment. It should also be noted that, in this simplistic cost-effectiveness analysis, the costs shown do not include opportunity costs such as taking law enforcement officers away from other duties to do Driving Under the Influence (DUI) enforcement. There is no estimate of the contributed value of the time of many community volunteers. This illustration does not include the cost of data collection used for evaluation and as management information to aid community staff. This very simple cost-effectiveness analysis is provided simply as an illustration. A more complete analysis would require more complex adjustments and calculations. The full cost effectiveness of the Community Trials Project will not be known until much later when all archival data on alcohol-involved injuries and deaths are available for analysis. The total community program cost, however, remains constant as described in this simple calculation. Any further reductions in injuries or deaths will improve the cost-effectiveness ratio.

FINAL THOUGHTS ON THE USE OF POLICY TO INCREASE LOCAL HEALTH AND SAFETY

Science can help inform local policy. In general, many alcohol policy approaches (which usually are environmental strategies) have demonstrated evidence of potential effectiveness. Evidence has been collected for policies related to retail price, availability of alcohol, location and type of alcohol outlets including hours and days of sale, retail and social access to alcohol by young people, and enforcement and sanctions against high-risk alcohol use, for example, drinking and driving (see Edwards et al., 1994). Thus, policy at the local level can have a base of science on which to rest. This is not to imply that all policies are locally tested; only the potential may have been demonstrated. In all three experimental communities, coalition members quickly wanted to move beyond problem definition to discussion of what science could say about what works. Members embraced the contribution of project scientists and were quick to understand the utility of project data collection for mid-course correction of intervention efforts.

Most community prevention efforts involve the delivery of prevention "services" to individuals such as students or high-risk youth. These activity-based prevention efforts require an organizational structure, philosophy, and resources very different from the organizational base required for policy-based interventions. Policy-based interven-

tions require a coalition to be more thoughtful, strategic, and purposeful and require a different perspective than do activity-based program interventions. In our experience, attempts to combine these efforts can sabotage policy-based initiatives.

Local news disseminated via local mass media is essential to local policy development. Media advocacy is the strategic use of media to advance policy goals (Holder & Treno, 1997; Wallack, 1990). Without skillful media work it is very difficult (perhaps impossible) to create policy-driven structural changes within a community. Local policies can have lower costs. There are few cases in which the actual cost of prevention programs or policies has been documented. However, on the average, alcohol policies as they involve changes in rules and regulations or increased emphasis on enforcing existing laws can be lower in cost than specially funded local prevention programs (such as treatment or education), which require long-term investment in staff, materials, and other resources. For example, the cost of teacher and school administrator time, curriculum materials, and other costs for a school-based educational program likely exceed the cost of a local retail policy by off-premise establishments to reduce retail sales of alcohol to underage persons and reinforcement of this policy by increased law enforcement. Raising the retail price of alcohol at a local level through local special-purpose taxes can both generate increased revenue and act as a low-cost prevention strategy. Of course, a local policy that raises the priority of regular high-intensity activities targeting drinking and driving represents a true "cost" to the community, as such a policy competes with other priorities of law enforcement.

Policies can be self-sustaining because they can have a longer life, once implemented, than prevention programs that must be maintained and, thus, funded each year. A policy of required training for alcoholic beverage servers in bars and restaurants through an existing adult education system has a potentially longer period of effectiveness than does a professionally planned public education campaign that must be funded and implemented each year. Even when the potential effectiveness of a policy decays over time due to lower compliance or lowered regulation or enforcement, policies can continue to have a sustaining effect, even without reinforcement.

INSTITUTIONALIZATION OF COMMUNITY PREVENTION PROJECTS

Institutionalization of community prevention projects that are effective could be considered the final test of their efficacy. If a scientifically driven community prevention effort can **not** be sustained, then its long-term value must be questioned. The scarcity of knowledge about the institutionalization of such efforts is due not only to the relative youth of such alcohol-related problem reduction projects, but also to the lack of data collection on what occurs after they officially conclude.

One of the characteristics of community system development is the formation and maintenance of institutions. Jepperson (1991) said an institution is a social pattern or order that can reproduce or sustain itself over time, independent of the particular people in the institution at any point in time. Despite the enthusiasm, energy, or good intentions of those who work in and support prevention, if prevention does not become a part of the routine and regular processes of the community (i.e., become institutionalized), the long-term value of their efforts is lost to the community (Renaud, Chevalier, & O'Loughlin, 1997).

Problems associated with alcohol use are present in nearly every community and involve a number of community subsystems. These subsystems involve dynamic social,

economic, and cultural arrangements that show a powerful resiliency over time. They include the retail sales of alcohol within the economic subsystem, the health subsystem that provides treatment, rehabilitation, and medical care for alcohol dependency and persons injured in alcohol-involved traffic crashes, and the legal subsystem that identifies, arrests, and prosecutes drunk drivers and intoxicated persons (Holder, 1998). Purposeful (and effective) community prevention is inherently disruptive to existing social and economic arrangements in the community because it disturbs the system. This means that community systems may resist prevention efforts, especially those that are designed outside of and imported into the community. Prevention efforts that disrupt the system are least likely to be easily institutionalized, even if they are effective in reducing problems. This suggests that institutionalization of any effective prevention effort requires a modification of some aspects of the community system, both to be preventative and to insure a long-term existence. Thus, activities that are designed to reduce problems must be accepted and sustained by the community. This is the basic requirement of institutionalization of community prevention.

The following factors appear to support the long-term maintenance (see Holder & Moore, 2000) for a longer discussion on which these observations are based. Community action projects must take into account local values and culture in their design and implementation. Sustainability of projects is based upon purposefully involving the community in developing concepts, expressions, language, and goals that reflect the cultural values of the communities involved. Obtaining the support of community leaders is required in community action research. In the same fashion, the continuation of a project beyond its demonstration phase requires community leader support for institutionalization. A factor common to institutionalized projects is that the communities in which they were initiated judged the projects' issues to be relevant to their own needs and concerns. In short, community members found a way to continue the projects even without outside funding and continued guidance from researchers and community organizers.

Project staff who are local residents, who are respected by community leadership, and who know and understand the community make an important contribution to institutionalization. Indigenous staff members have the ability to represent the interests and goals of the project within the social and cultural context of the community, and they are more likely to develop the project in a form that is acceptable and attractive to citizens. An essential ingredient for long-term maintenance of any community prevention effort is the development of local resources in support of such interventions. Without local resources, no community prevention effort can become totally institutionalized. As is illustrated by the Community Prevention Trials Project (Holder & Reynolds, 1998), after a 5-year research period, each of the communities was successful in developing resources to continue the prevention effort. Project directors in each site devoted significant portions of their time to writing proposals in response to a wide variety of funding announcements. At least some of those proposals were rewarded with funding. Specifically, one community utilized national and local foundation grants, one obtained county health funding, and another obtained state funding to nurture their environmentally-oriented prevention programs. If a project results in tangible success before its conclusion, such results increase the chances of its continuation. The drinking and driving enforcement successes and other measurable effects from the interventions in the Community Trials project were leveraged successfully. Thus, documenting and publicly celebrating early successes may be considered investments in institutionalization. Institutionalization of community action programs should be distinguished from the even more desirable outcome of institutionalizing

health-related behavior changes as supported by relatively permanent improvements in policy or enforcement. As the field of community action in alcohol prevention matures further, and more projects initiated by researchers in a variety of countries are brought to a formal close, we will learn more about the factors that either increase or diminish the institutionalization of the changes sought by those projects.

SUMMARY AND CONCLUSIONS

This review of community approaches to the prevention of alcohol problems at the local level provides important conclusions. The evidence from controlled prevention trials at the community level demonstrate the potential of theory-driven, community environmental approaches to reduce local alcohol problems. Community action projects are just that, projects that seek to address the total community system and are not limited to a specific target or service group. These are efforts to involve community leadership in designing and implementing and supporting approaches to reduce problems across the community in total.

To be effective, community action projects must involve leaders and citizens. These projects can be described as a partnership between the community and researchers. Each of these projects represent instances in which researchers participated in the design, supported the implementation of program activities, and conducted the process and quantitative evaluation for the local program. Such evaluations not only contribute to increasing the scientific basis of community action projects designed to reduce alcohol problems, but also increase the level of solid information that can be shared with the community about the results of their own effort.

Community projects for alcohol problem prevention confirm that changes in attitudes and beliefs are easier to attain than changes in either individual behavior (e.g., rates of problem drinking) or outcome measures (e.g., alcohol-related car crashes). A number of factors may account for this. Traditional attempts to treat and serve isolated high-risk groups have ignored the fact that most alcohol problems are not produced by members of such groups. Members of high-risk groups may be hard to find or resistant to change, and the cost associated with the treatment/service approach may be prohibitive. This suggests that alcohol problems are best considered in terms of the community systems that produce them. Local prevention strategies have the greatest potential to be effective when prior scientific evidence is utilized and policy is utilized to make changes. We should note that national as well as state or provincial laws often establish the base for local policies, including legal drinking ages, regulation of alcohol outlets, the legal blood alcohol level for drinking and driving, advertising restrictions, and service to obviously intoxicated persons and underage persons. Local policies often address the implementation and enforcement of these existing laws.

Finally, more study needs to be directed toward establishing the efficacy of local prevention programs within minority neighborhoods that typically experience alcohol problems differing from those of the majority in these communities. Toward this end, the National Institute on Alcohol Abuse and Alcoholism is currently sponsoring a project in two largely Hispanic low-income neighborhoods in northern California, that utilizes some of the environmental strategies tested in the Community Trials Project. This project, though similar to the Community Trials project in terms of its environmental approach, differs in a number of important regards. First, project interventions are to be implemented at the neighborhood as opposed to the community level. Second, project in-

terventions have been tailored to address the unique drinking problems and patterns characteristic of neighborhoods with large numbers of low-income minorities. Third, the focus of project interventions is on youth and young adults (aged 15 to 29) who disproportionately experience alcohol-related problems in these neighborhoods. Such a project represents part of the next wave of community action projects to reduce alcohol problems.

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