

Comprehensive Community Interventions to Promote Health: Implications for College-Age Drinking Problems

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ABSTRACT. *Objective:* This article reviews comprehensive community interventions that sought to reduce (1) cardiovascular disease risks; (2) smoking; (3) alcohol use disorders, alcohol-related injury and illicit drug use; or (4) sexual risk taking that could lead to HIV infection, sexually transmitted disease and pregnancy. *Method:* Comprehensive community programs typically involve multiple city government agencies as well as private citizens and organizations and use multiple intervention strategies such as school-based and public education programs, media advocacy, community organizing, environmental policy changes and heightened enforcement of existing policies. This review focused on English-language papers published over the past several decades. *Results:* Some programs in each of the four problem areas achieved their behavioral and health goals. The most consistent benefits were found in programs targeting behaviors with immediate health consequences such as alcohol misuse or sexual risk taking. Results were less consis-

tent when consequences of targeted behaviors were more distant in time such as cardiovascular risks and smoking. Also, programs that targeted youth to prevent them from starting new health-compromising behaviors tended to be more successful than programs aimed at modifying preexisting habits among adults. Programs that combined environmental and institutional policy change with theory-based education programs were the most likely to be successful. Finally, programs tailored to local conditions by the communities themselves tended to achieve more behavior change than programs imported from the outside. *Conclusions:* Comprehensive community intervention approaches may have considerable potential to reduce college-age drinking problems, especially given the success of these programs in reducing alcohol-related problems and in preventing health-compromising behaviors among youth. (*J. Stud. Alcohol*, Supplement No. 14: 226-240, 2002)

CITING THE SUCCESS of comprehensive multifactorial community interventions with other public health problems, the National Academy of Sciences has recommended this approach for reducing alcohol-related health problems (Institute of Medicine, 1989). This approach was initially used to reduce heart disease and cardiovascular risks. More recently, it has targeted underage drinking, traffic and other unintended injuries caused by alcohol use as well as unplanned pregnancy, infections with HIV and other sexually transmitted diseases.

Traditional public health strategies attempt to identify and intervene with specific subpopulations at high risk for a targeted health problem. In contrast, comprehensive multistrategy community programs attempt to involve the total community and its constituent organizations, institutions and individuals across demographic and risk spectrums. Comprehensive community programs addressing problems associated with alcohol have involved multiple agencies in city government as well as private citizens and private organizations. Such programs seek to stimulate behavior change by influencing the normative environment in which high-risk individuals live.

Comprehensive community interventions are also distinguished by the use of multiple intervention strategies for

changing health-related behaviors. Although programs differ with respect to content and behavioral targets, they typically include some combination of: school-based education, public information programs, medical screening and treatment, media advocacy, organizing and mobilizing of different community groups and populations, promotion of environmental changes that can influence the price and availability of products like alcohol and tobacco that affect health and programs to publicize and enhance enforcement of existing laws pertaining to the use of alcohol, tobacco or other drugs. Programs can also provide social and entertainment activities that are alcohol, drug or tobacco free or that promote healthy lifestyles such as exercise and good nutrition.

Although comprehensive community interventions share the common features of multiple participants and interventions, they have varied on a number of dimensions, including the primary target population, the geographic or organizational setting, who initiated the program and the location of the director. Primary target populations can include all members of a community, youth, adults, elderly, certain minorities or racial subgroups or groups with distinct behaviors. Geographic and organizational settings can range from cities to neighborhoods or counties and may or may not reflect geopolitical units. Initiators of such programs have varied from university researchers to members of city government or private organizations within a community.

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TABLE 1. Cardiovascular risk reduction programs

Name of study	Behavioral targets	Intervention	Theoretical model	Research design	Results
North Karelia Project (Puska et al., 1981)	Reduce cardiovascular risks: • Smoking • Diet • Hypertension	<ul style="list-style-type: none"> Organized work groups on health education, stroke registration hypertension Community analyses survey and mortality data, insurance Health education meetings Radio station given information Leaflets and posters prepared on cardiovascular risks News articles, health reports, editorials and interview Training provided to health care professionals about cardiovascular risk factors, hypertension, smoking cessation, nutrition, heart disease diagnosis and treatment No smoking policies in schools, health centers, restaurants, offices Smoking cessation, nutrition and weight reduction courses 	Information and health belief	Quasi-experimental Comparison N. Karelia with Kuopio Province in Finland • Surveys '72, '77, '82, '87, '92 • Blood pressure taken • Blood samples drawn	<ul style="list-style-type: none"> Serum cholesterol declined 16% in N. Karelia vs 12% control 1972-92 Diastolic BP declined 8-10% both areas Smoking declined 52% to 37% N. Karelia vs 49% to 37% comparison
North Karelia School Smoking Prevention (Vartiainen et al., 1998)	• Smoking	<ul style="list-style-type: none"> 2-year school program Students taught about pressures to smoke Role playing to increase resistance skills Short- and long-term hazards of smoking discussions Peer-led education 	Social influence	Quasi-experimental	<ul style="list-style-type: none"> Mean cigarette 22% lower in program schools vs controls; 30% prevalence of smokers vs 41% among controls
Pawtucket Heart Health Program (Carleton et al., 1995)	Reduce: • Elevated blood pressure • Cigarette smoking • Physical inactivity	<ul style="list-style-type: none"> Self-help course Small group classes Risk factor measurement and counseling Involved 500 community organizations 27 schools, all supermarkets, many government departments Labeling of low fat food in stores Restaurant menus highlighted low fat meals Heart health curriculum elementary through high schools 	Behavior change Development of social supports	Quasi-experimental Pawtucket compared with a southern New England city Repeat cross-sectional survey every 2 years	<ul style="list-style-type: none"> Smoking down both cities No significant difference Body mass indices increased in both cities, up more in comparison Largest decreases in projected heart disease rates in Pawtucket: 15% but the difference declined to 8% after the program ended and latter was not significant
Stanford 5 City Project (Farquhar et al., 1990; Winkleby et al., 1996)	• Reduce cardiovascular morbidity and risk factors, mortality	<ul style="list-style-type: none"> Mass media and interpersonal education program for both the public and health professionals Community organizing was undertaken to create social and institutional support to sustain the initiative 	Social learning theory Persuasive theory Marketing theory Community change theory	2 intervention communities were compared with 3 matched control communities	<ul style="list-style-type: none"> 6 yr improvement in CHD knowledge (this dissipated) Blood pressure reduction by Year 9 after the program) significantly greater in intervention communities at Year 9 No greater smoking reduction at Year 9 Significantly greater mortality risk for women but not men No body mass differences for women; male controls did better than men in intervention cities Treatment cities had a significantly better mortality risk for women but not men

Continued

To date, few comprehensive community interventions have explicitly included colleges and universities in developing and implementing interventions, and fewer still have specifically evaluated program impact on college students. Further, not all of these comprehensive community interventions have produced the desired public health objectives. This review of comprehensive community programs was conducted to assess what program components or char-

acteristics might be useful to implement to reduce alcohol misuse and related health and social problems among college students.

Cardiovascular Risk Reduction Projects

Several comprehensive community intervention initiatives to reduce cardiovascular risks have been reported in

TABLE 1. *Continued*

Name of study	Behavioral targets	Intervention	Theoretical model	Research design	Results
Minnesota Heart Health Program (Luepker et al., 1994)	<ul style="list-style-type: none"> • Reduce heart disease in 3 north central communities • Lower blood cholesterol • Lower blood pressure • Smoking reduction • Increase physical activity 	<ul style="list-style-type: none"> • Risk factor screening and follow up • Community analysis and organization • Direct adult education • Environmental changes • Risk factor screening and education with 60% of adults • Face to face interventions with 30% of adults • Health professional education • Youth education • School-based education 	<ul style="list-style-type: none"> • Social learning theory • Persuasive communication theory 	3 communities vs 3 matched control communities compared through cohort survey over a 6-7 yr period	<ul style="list-style-type: none"> • No significant group differences seen on: <ul style="list-style-type: none"> • Blood cholesterol • Smoking • Blood pressure • Body mass index or overall heart disease risk • Slightly beneficial effects for smoking among women and exercise in final wave of the study
Class of 1989 Study (Perry et al., 1992)	<ul style="list-style-type: none"> • Reduce adolescent smoking • Program offered to 8th graders 	<ul style="list-style-type: none"> • Students learn short-term consequences of smoking • Group sessions • Teach students it is not normative • Students learn to resist peer pressure and advertiser pressures to smoke • Students make public commitment not to smoke 	<ul style="list-style-type: none"> • Problem behavior • Social learning theory • Persuasive communication theory 	Quasi-experimental	<ul style="list-style-type: none"> • Students in intervention communities 40% less likely to smoke
Physical Activity Program (Kelder et al., 1993)	<ul style="list-style-type: none"> • Encourage regular aerobic physical activity 	<ul style="list-style-type: none"> • Instruction monitoring heart rate • Peer-led 10-lesson curriculum to promote physical activity and healthy eating • Create school, family, peer support • 4-week community wide competition 	<ul style="list-style-type: none"> • Social learning theory 	Quasi-experimental intervention vs control community annual surveys	<ul style="list-style-type: none"> • Males reported more exercise in intervention community in 7th- and 11th-grade surveys • Females reported more exercise in all but the 11th-grade survey

the scientific literature. In the United States, these efforts have focused much more on individual change than on the political, regulatory or enforcement environments (Table 1).

The *North Karelia Project* (Puska et al., 1981; Vartiainen et al., 1994, 1998), the first community demonstration program to reduce cardiovascular disease risks, began in an eastern province of Finland in 1972, which at that time had the highest coronary mortality rate in the world. A steering committee and working groups on health education, stroke registration and hypertension control were organized. Community analyses were undertaken using baseline survey, insurance, health systems and mortality data. Education on smoking, diet and hypertension was conducted through voluntary organizations, health and social service organizations, radio and television. Leaflets and posters on smoking, diet, hypertension, physical exercise and advice to heart disease patients were distributed at clinics, schools, voluntary organizations, banks, pharmacies and other stores. Training was offered to health center personnel, doctors, public health nurses, teachers and social workers regarding the measurement and management of cardiovascular risk factors, smoking cessation, nutrition, hypertension and coronary disease. The program promoted "no smoking" policies in health centers, schools, restaurants and offices; the growing of vegetables; and production of lower fat foods. Hypertension, stroke and heart disease registries were started.

To evaluate the efficacy of these programs, North Karelia was compared with the Kuopio Province in Finland. Sur-

veys of both areas were completed in 1972, 1977, 1982, 1987 and 1992. Blood pressure measurements and blood samples were collected.

Serum cholesterol declined 16% in North Karelia and 12% in Kuopio from 1972 to 1992. Systolic blood pressure declined 4% in Kuopio from 1972 to 1992. Declines in diastolic blood pressure were similar in both areas: 8-10% from 1972 to 1992. Smoking declined from 52% to 32% among men in North Karelia, significantly more than among men in Kuopio (from 49% to 37%). The greatest declines occurred during the first 5 years of the program and helped to stimulate interest in comprehensive community interventions for coronary disease prevention in the United States.

Beginning in 1978, a school-based component of the North Karelia program exposed seventh grade students to a 2-year five-session smoking prevention program using a social influence approach (Vartiainen et al., 1998). Students were taught about pressures to smoke exerted by peers, adults and mass media and were trained to deal with these pressures. Short- and long-term hazards of smoking were discussed.

In 1993, mean lifetime cigarette consumption was 22% lower among program participants than among students in comparison schools. The mean prevalence of smoking was 30% among program participants and 41% in control subjects. Investigators concluded that long-term smoking prevention effects could be achieved if a school-based program using a social influence model were combined with community and mass media interventions (Vartiainen et al., 1998).

Comprehensive community interventions to reduce cardiovascular risks among U.S. adults have not been as successful as the North Karelia study, but school-based components have achieved some desired behavior changes.

The *Pawtucket Heart Health Program* (Carleton et al., 1995) sought to reduce elevated blood pressure, cigarette smoking and physical inactivity. Phases of behavior change, awareness and agenda setting were promoted, and training was provided in behavioral skills and development of social supports. A community activation component encouraged individuals to participate in self-help courses, direct risk-factor measurement and counseling. More than 500 community organizations and more than 3,500 volunteers were involved, including public and private schools, supermarkets, grocery stores, religious and social organizations, larger work sites, restaurants and most departments of city government. The program introduced grocery store labeling of low fat food; a nutrition education program at the public library; restaurant menus highlighting health foods; and a heart health curriculum in elementary, middle and high schools. At least 42,000 individuals participated in one or more program.

In a quasi-experimental evaluation design, Pawtucket was compared with a southern New England city with similar sociodemographic characteristics. Large-scale cross-sectional surveys were conducted in each community at 2-year intervals.

Smoking declined 6.6% in the intervention group and 8% in the comparison city. There was no significant difference between cities in changes in mean blood pressure or blood cholesterol. Body mass indices increased in both cities but significantly more so in the comparison city. The projected cardiovascular disease rates were significantly less—15% in Pawtucket during the intervention program—but the difference declined to 8% after the program ended, a difference that was no longer statistically significant. The Pawtucket Heart Health evaluators concluded that they found very limited evidence that cardiovascular risk factor behaviors and disease risk changed through a process of community activation at the individual, group, organization and community levels.

The *Stanford 5 City Project* (Farquhar et al., 1990; Winkleby et al., 1996) sought to reduce cardiovascular risk factors, morbidity and mortality. The program used both mass media and interpersonal education programs. Messages were developed using social learning theory, social marketing theory, persuasion theories and community development strategies. Community organizing was undertaken to create social and institutional support to sustain the program's initiatives.

In both intervention and comparison cities, there were improvements over time in cardiovascular disease knowledge, cholesterol and smoking, making between-city group differences more difficult to observe. Six years after the start of the program, there were significant improvements

in the two program communities relative to three matched comparison communities in knowledge about coronary heart disease etiology and risk factors. These differences dissipated by the 9-year follow-up. There were no significant reductions in blood pressure at 6 years, but by the 9-year follow-up the intervention cities had significantly greater declines in blood pressure than comparison areas. No significant differences in smoking rates were seen between intervention and comparison areas at 6- or 9-year follow-ups. There were no significant differences in body mass indices for women. However, for men, the control cities actually had more favorable scores at the 9-year follow-up. Nine years after the start of the program, the treatment cities had a significantly better mortality risk for women but not men.

The *Minnesota Heart Health Program* (Luepker et al., 1994) involved nearly 400,000 people in six communities. Initiated in 1980, it sought to reduce cardiovascular morbidity and mortality by 15% by reducing sedentary behaviors, cigarette smoking, blood cholesterol levels and blood pressure levels. The intervention operated at the individual, group and community levels and embraced a wide range of strategies and theories, including social learning theory and persuasive communications theory. The program alerted people to health issues and provided incentives to adopt effective health promoting behavioral alternatives. Community leaders were encouraged to foster environmental change to support risk reduction. Mass media established awareness of the program, disseminated risk factor messages and enhanced the salience of healthy lifestyles. Community health professionals were involved through their local organizations and preventive practice advisory committees. More than 60% of all adult residents received onsite risk-factor screening, education and counseling. The adult education component provided multiple-contact programs of intensive personal counseling on cardiovascular risk reduction. School-based education discouraged health-compromising behaviors in youth and their parents.

Three pairs of communities, matched on size and type, were compared through cohort surveys over a 6- to 7-year period. Against a backdrop of strong secular trends of increasing health promotion and declining risk factors, the overall program effects were modest in size and duration and generally within chance levels. No significance between group differences were seen in blood cholesterol, smoking among men, blood pressure, body mass index or overall coronary heart disease risk. Slight beneficial treatment effects were seen for smoking among women and exercise in the final wave of the study.

Two school-based educational components of the Minnesota Heart Health Program, however, achieved more marked behavioral changes. First, the *Class of 1989 Study* (Perry et al., 1992), an intensive intervention to reduce or prevent adolescent smoking, was offered to seventh grade

TABLE 2. Community programs to reduce smoking

Name of study	Behavioral targets	Intervention	Theoretical model	Research design	Results
Tobacco Policy Options for Prevention Project (Forster et al., 1998)	• Youth tobacco use	• Change local ordinances to restrict youth tobacco access, and retailer and adult practices that provide youth access to tobacco • Community organizing • Tobacco purchase attempts tried by youth	Community mobilization Deterrence	Random assignment of 14 communities to intervention and control groups	• Little effect on perceived tobacco availability through commercial sources • Reduced perceived access through commercial services • Purchase attempts declined significantly but not significantly more so than in control communities • Smoking by adolescents increased less in intervention than in control communities
Massachusetts Youth Tobacco Enforcement (Rigotti et al., 1997)	Reduce sales of tobacco to youth and youth tobacco use	• Quarterly compliance checks of sales to youth • Fines for noncompliance	Deterrence	Quasi-experimental: 3 intervention matched to 3 comparison communities	• Reduction of 68% to 11% of vendors selling to youth vs 68% to 55% in control communities, but no reported change in adolescent tobacco use
Erie County Youth Tobacco Enforcement (Cummings et al., 1998)	• Reduce sales of tobacco to youth	• Compliance checks of sales preceded by warning letters	Deterrence	Quasi-experimental: 6 intervention communities compared with 6 matched controls	• Vendors in both experimental and control communities knew about the program and compliance increase in both • No significant difference between communities
Central Harlem (Gemson et al., 1998)	• Reduce sales of tobacco to youth	Education vs enforcement of tobacco sales laws, with compliance checks and fines for violation	Deterrence	Quasi-experimental	• Decline from baseline: 70% sales at baseline, 16% decline in control stores, 34% decline in education stores, 56% decline in enforcement stores
Community Intervention Trial for Smoking Cessation (COMMIT Research Group, 1995a,b)	• Reduce heavy smoking	• Bring diverse organizations and institutions together to conduct smoking cessation • Education through media and community wide evaluations • Health care providers • Work sites create demand for cessation services \$220,000/yr per community • Cessation Resources Guide		Randomly assigned communities; 11 matched pairs of communities, 10 in U.S., 1 in Canada Self-reported smoking	• No difference in quit rates for heavy smokers • 3% greater quit rate among light to moderate smokers ($p = .004$) • Changes in overall community smoking • Percentage difference in smoking reduction between intervention and control communities was not significant
Neighbors for a Smoke Free North Side (Fisher et al., 1998)	• Reduce smoking all ages	• Community organizing, emphasizing involvement of local organizations in promoting nonsmoking • Wellness council in each neighborhood • Citywide advisory board • Smoking cessation classes • Billboards • Gospel fest • Door-to-door education		Quasi-experimental: 3 predominantly low income neighborhoods compared with 3 in Kansas City 600 miles away	• 7% decline in smoking prevalence vs only 1% change in comparison

students in the fall of 1984. It addressed social and psychological factors that encourage smoking. Students identified the short-term consequences of smoking, such as smelling like smoke or having bad breath. Their expectations of how many of their peers smoke were compared with actual data on smoking prevalence. Reasons people smoke were studied, and positive alternatives were offered. Finally, students learned skills to resist advertising, peer and adult pressures to smoke. Participants created anti-tobacco advertisements, skits and role-playing scenarios. Sixth grade students made public commitments not to smoke.

Annual surveys from 1983 to 1989 compared one of the intervention communities to its matched pair. Although smoking rates among students in the two communities were comparable at baseline, the proportion of adolescents smoking at the end of high school was significantly lower in the intervention community, with 14.6% of students smoking at least weekly in the intervention group compared with 24.1% in the control community. The authors concluded that the study results permit optimism about the benefits to youth of long-term school-based community-wide programs for delaying onset of smoking.

Second, a peer-led physical activity program designed for eighth grade students using social learning theory encouraged regular aerobic physical activity through a 4-week community-wide competition (Kelder et al., 1993). Students in the intervention community were challenged to exercise outside of school the equivalent of bicycling 250 miles. They received instruction on monitoring heart rates and choosing aerobic activities. In tenth grade, a 10-lesson peer-led curriculum to promote healthy eating and regular aerobic activity was introduced. The program used environmental-level strategies by having same-age peers provide new opportunities for healthier eating, physical activity and reducing barriers to aerobic activity at school and by creating peer, family and school personnel support. Based on annual surveys in the intervention and matched-pair community, females in the intervention community reported at follow-up greater hours of exercise in all but the eleventh grade. Males in the intervention community reported significantly more exercise in the seventh and eleventh grade surveys. Overall, the most pronounced differences were among females.

Community Interventions to Reduce Smoking

Comprehensive community programs have also attempted with mixed effectiveness to reduce tobacco use among youth and adult populations (Table 2).

The *Tobacco Policy Options for Prevention Project* (Forster et al., 1998), a 32-month intervention, sought to reduce youth access to tobacco by community mobilization to change local ordinances, retailer and other adult practices regarding provision of tobacco to youth and increased enforcement of age of sales laws. Fourteen Minnesota communities were randomly assigned to intervention or comparison conditions. Tobacco purchase attempts by youth were tried at all tobacco outlets in June 1993 and June 1996.

School surveys in 1993 and 1996 with more than 6,000 students indicated smoking by adolescents increased in both sets of cities, but less in the intervention communities. The intervention had little effect on perceptions of tobacco availability through social sources, but it reduced perceived access through commercial sources. Purchase attempts declined significantly in the intervention communities. In all communities, there was a sharp decrease in youth purchase attempts that resulted in sales. This decline, however, was not significantly greater in the intervention cities.

Rigotti et al. (1997) compared three Massachusetts communities that increased enforcement of youth tobacco laws with three matched comparison communities. Health departments in the intervention communities began quarterly compliance checks with underage purchase attempts. At baseline, 68% of vendors sold to minors, with no statistical difference between intervention and control community. Two years later, only 18% of the vendors in the interven-

tion communities compared with 55% in the comparison communities sold to minors. However, three annual surveys with more than 17,600 respondents revealed only a small drop in the ability of adolescents under age 18 to purchase tobacco and no decline in its use.

Cummings et al. (1998) reported on a similar enforcement program in Erie County, New York. Six pairs of communities were matched on sociodemographic characteristics, population and number of tobacco outlets. Underage purchase compliance checks directed by local police were conducted in 366 stores at baseline and 319 at follow-up. All tobacco vendors were sent a letter about tobacco laws pertaining to minors and a warning that compliance checks were planned. There was a dramatic increase in compliance with the law in both enforcement and nonenforcement communities. However, compliance rates between the two groups of communities did not vary because most vendors in both areas knew about the enforcement program and the perceived enforcement as more vigilant.

Gemson et al. (1998) reported results from a randomized trial of 15 tobacco vendors in Central Harlem. Stores were randomly allocated to control, education or enforcement conditions. Surveys of underage tobacco purchase compliance were conducted in October 1993 and in April 1994. During both surveys, violators in the enforcement group of stores were fined in accordance with the state law.

At baseline, 70% of stores sold loose cigarettes, and 98% sold either singles or packs of cigarettes. At the 6-month follow-up, sales declined 16% among control stores, 34% among education stores and 56% among enforcement stores.

The *Community Intervention Trial for Smoking Cessation* (COMMIT) (COMMIT Research Group, 1995a,b) was designed to help smokers, especially heavy smokers, achieve and maintain cessation. Within each of 11 matched community pairs, one community was randomly assigned to receive the intervention from January 1989 to December 1992. COMMIT was a partnership with National Cancer Institute staff, 11 participating research institutions and their corresponding local communities. Each community formed a community board. COMMIT fostered demand for cessation services, using public education through media and community-wide events, health care providers, work sites and other organization and cessation resources. The protocol mandated 58 activities to be carried out by local staff or agencies.

Based on a longitudinal survey, the investigators found no significant changes at follow-up among heavy smokers across the experimental groups. Quit rates for light/moderate smokers at baseline were .306 in intervention communities versus .275 in comparison communities, a significant between-group difference. Random digit dial cross-sectional surveys of approximately 2,800 subjects per city were conducted at baseline and follow-up. Overall, smoking preva-

lence decreased 3.5% in the program communities versus 3.2% in the comparison communities, a nonsignificant difference.

Neighbors for a Smoke Free North Side (Fisher et al., 1998) emphasized neighborhood-based governance and resident involvement around the goal of nonsmoking. Wellness councils including neighborhood volunteers and paid staff members ran the program for 24 months. The program included smoking cessation classes, billboards, door-to-door campaigns and a gospel fest. Three predominately low-income black neighborhoods in St. Louis received the intervention and were compared with similar neighborhoods in Kansas City. Random digit dial telephone surveys in 1990 and 1992 indicated smoking prevalence declined 7% in St. Louis, significantly more than in Kansas City, where it declined 1%.

The evaluators of the Smoke Free North Side intervention suggest this program had greater success than COMMIT because COMMIT was centrally developed at the national level. COMMIT was delivered to communities rather than developed by the communities.

Comprehensive Community Programs Addressing Alcohol-Related Problems

Several comprehensive community intervention programs have addressed alcohol use or related problems with positive results (Table 3). Two sought to reduce alcohol and other substance use among elementary and middle school students (Chou et al., 1998; Pentz et al., 1989; Perry et al., 1996). One focused on reducing access to alcohol and drinking among underage adolescents (Wagenaar et al., 2000a,b). Two others targeted entire community populations, including adolescents and young adults (Hingson et al., 1996; Holder, 1997; Holder et al., 2000). Although none specifically measured college drinking and related problems, these studies nonetheless have the most direct implications for those planning comprehensive community college interventions to address alcohol-related health problems.

The *Midwestern Prevention Project* (Pentz et al., 1989) attempted to prevent substance abuse among adolescents ages 10-14 in Kansas City, Missouri, and Indianapolis, Indiana. A quasi-experimental design in Kansas City and a randomized experimental design in Indianapolis evaluated the program. In Kansas City, from September 1984 to January 1986, students received a 10-session youth training program on skills for resisting alcohol, tobacco and illicit drug use; homework involving active interviews; and role plays with parents and family. Most students interviewed parents and family members about family rules regarding the use of these substances and regarding successful techniques to avoid their use and counteract media and community influences. Mass media coverage focused on psychosocial consequences of substance abuse; correction of perceptions about the prevalence of peer drug use; recognition of adult media and community influences on substance use; peer

and environmental pressure resistance; and statements of public commitments to avoid alcohol, tobacco and other drug use. Modeling and role playing of resistance skills, feedback with peer reinforcement, peer leader facilitation and discussion of homework results were part of the program.

Of the 42 schools that participated, 4 were randomly assigned to the program condition and 4 to the control condition. The remaining 34 were assigned on the basis of schools' willingness to accept the program; 20 were willing, and 14 were not. This willingness may have reflected higher salience of substance abuse in those schools. The 20 willing schools were assigned to the program, raising the total number of intervention schools to 24; there were 18 control schools.

Although cigarette, alcohol and marijuana use increased in both groups, increases for all substances were significantly lower in the intervention group 2 years after the program. When students in the 24 intervention schools were compared at 1-year follow-up with students in comparison schools, prevalence of use of all three drugs was lower in the intervention schools: 11% versus 16% for alcohol use, 17% versus 24% for cigarette use and 7% versus 16% for marijuana use.

In a study by Chou et al. (1998), investigators tracked 1,904 students exposed to the program in Indianapolis. They were compared with 1,508 students in the control group. Schools were randomly assigned to groups, and students were followed at 6 months, 1.5 years, 2.5 years and 3.5 years after baseline. After analytically controlling for ethnicity, gender, socioeconomic status, father's occupation and school type and grade, the researchers found that, among subjects using alcohol, tobacco or other drugs at baseline, secondary prevention effects reducing alcohol use were found at the 6-month and 1.5-year follow-up and for tobacco use at 6-month follow-up. Results for marijuana use were inconsistent over time.

Project Northland (Perry et al., 1996) in Minnesota was designed to reduce alcohol use among young adolescents. Sixth, seventh and eighth graders were exposed to a 3-year behavioral curriculum, with peer leadership, parental involvement and community task force activities. Students learned how to resist peer influence and normative expectations about alcohol and methods to bring about community social, political and institutional change in alcohol-related programs and policies. Students interviewed parents, local government officials, law enforcement personnel, retail alcohol merchants, schoolteachers and administrators about their beliefs and activities concerning adolescent alcohol use. A "town meeting" conducted by students made recommendations for community action for alcohol use prevention.

Community task forces including government officials, law enforcement personnel, school representatives, health professionals, youth workers, parents, concerned citizens

TABLE 3. Comprehensive community projects to address alcohol problems

Name of study	Behavioral targets	Intervention	Theoretical model	Research design	Results
Midwestern Prevention Project (Pentz et al., 1989)	<ul style="list-style-type: none"> • 6th-7th graders: the level of cigarette, alcohol and marijuana use can be reduced even among those using at baseline 	<ul style="list-style-type: none"> • 10 session youth education program • 10 homework role plays and interview with parents • Peer-led education • Parental and community organization of media • Consequences and corresponding beliefs about correct prevalence of use • Recognize and resist media, peer and environmental pressures to use substances 	Social influence model	Quasi-experimental design in Kansas City Experimental randomized design in Indianapolis	Kansas City <ul style="list-style-type: none"> • Increases in alcohol, tobacco and marijuana were less in the intervention schools Indianapolis <ul style="list-style-type: none"> • Reduced alcohol consumption 6+18 months • No diff. in marijuana use • Cigarette use reduction at 6 months + 2.5 years
Project Northland (Perry et al., 1996)	<ul style="list-style-type: none"> • Reduce adolescent alcohol use and related problems • 6th, 7th, 8th grader: reduce demand for and supply of alcohol to minors 	<ul style="list-style-type: none"> • School-based curricula: audiotape cassettes, class games, problem solving, role plays, resistance skills, group discussions, peer leaders • Parental involvement, books mailed to parents • Community-wide task force including passage of alcohol-related ordinances • Town meetings 	Social learning theory	Quasi-experimental longitudinal surveys	<ul style="list-style-type: none"> • Significant reductions in drinking among students in intervention communities • Decrease past week use; 30% reduction in cigarette and marijuana use, particularly among those who had not used it by the start of the program
Communities Mobilizing for Change (Wagenaar et al., 2000a)	<ul style="list-style-type: none"> • Reduce availability of alcoholic beverages to underage youth and reduce alcohol outlets selling to minors • Peers, siblings, parent organization through city, schools, enforcement agencies, alcohol business associations and media 	<ul style="list-style-type: none"> • Community organizing • Meetings with community leaders and citizens • Compliance check surveys of alcohol sales to minors 	Community organizing deterrence	Randomized 15 community trials	<ul style="list-style-type: none"> • 17% increase in outlets checking IDs • 24% reduction in sales to minors • 25% reduction in the proportion of teens who tried to buy alcohol • 17% reduction in proportion of 16-20 year olds who supplied alcohol to younger teens • 7% decrease in alcohol consumption

Continued

and adolescents stimulated passage ordinances to prevent alcohol sales to minors and intoxicated patrons. Businesses provided discounts to students who pledged to be alcohol and drug free.

At baseline, 2,351 students were surveyed. Two-year follow-up rates greater than 80% were achieved in intervention and comparison groups. A higher percentage of students in the intervention group were alcohol users at baseline, whereas at follow-up the percentages that used alcohol in the past week and past month were lower in the intervention group. Differences were greatest and significant among those who did not use alcohol at baseline. No significant follow-up differences between groups were found on measures of cigarette smoking or marijuana use.

In the *Communities Mobilizing for Change* project (Wagenaar et al., 2000a), 15 communities were randomly allocated to intervention or comparison groups. A commu-

nity organizing intervention sought to reduce the number of alcohol outlets selling to youth under the legal drinking age and the availability of alcohol to youth from noncommercial sources such as parents, siblings and older peers. Action was encouraged through city councils, school and enforcement agencies, alcohol merchants, business associations and the media. A leadership strategy team changed numerous policies, procedures and practices in the *Communities Mobilizing for Change* group. In 1992 and 1995, approximately 4,500 twelfth graders were surveyed. A telephone survey of 3,095 18- to 20-year olds was conducted in 1992 and repeated in 1995. Response rates were greater than 90%. Compliance check surveys of sales to study confederates who appeared underage were conducted at more than 25 off-sale outlets in 1992 and 1995.

Relative to the comparison communities, the intervention communities achieved a 17% increase in checking age

TABLE 3. *Continued*

Name of study	Behavioral targets	Intervention	Theoretical model	Research design	Results
Community Prevention Trial Program (Holder, 1997; Holder et al., 2000)	<ul style="list-style-type: none"> • Community mobilization • Prevent underage sales to minors 	<ul style="list-style-type: none"> • Media advocacy, community organizing • Enforce underage sales laws • Responsible beverage service training 	Alter the environment of social and structural context of alcohol use	Quasi-experimental, pre- and posttest	<ul style="list-style-type: none"> • Significant reduction in buy attempts resulting in sales in intervention relative to control communities
(Saltz and Stanghetta, 1997)	<ul style="list-style-type: none"> • Illegal sales of alcohol to intoxicated bar and restaurant patrons 	<ul style="list-style-type: none"> • Monitor customer consumption of alcohol • Prevent intoxicated patrons from driving 	Deterrence		<ul style="list-style-type: none"> • No significant impact on serving intoxicated patrons
(Voas, 1997)	<ul style="list-style-type: none"> • Reduce drunk driving 	<ul style="list-style-type: none"> • Intensified DWI enforcement • Media advocacy • Officer training, greater use of breath tests, more checkpoints 	Deterrence		<ul style="list-style-type: none"> • Increased public perception of risk of arrest • Less drinking and driving • Reduction in alcohol-involved traffic crashes (impact in CA not SC)
(Reynolds et al., 1997)	<ul style="list-style-type: none"> • Reduce the density of alcohol outlets 	<ul style="list-style-type: none"> • Local zoning and land use planning approaches 		Quasi-experimental	<ul style="list-style-type: none"> • Local regulations for alcohol outlets and public sites for drinking were changed in all 3 exp. communities exceeding project goals
Massachusetts Saving Lives Program (Hingson et al., 1996)	<ul style="list-style-type: none"> • Reduce alcohol-related traffic deaths and injuries, all ages 	<ul style="list-style-type: none"> • Community organizing, locally developed interventions (e.g., speedwatch, speed signs, speed days, media advocacy, task forces) • School-based education • Police enforcement: under age purchase laws and drunk-driving laws • Media messages 	General social influence and deterrence	Quasi-experimental Matched intervention and comparison	<ul style="list-style-type: none"> • Significant declines in: <ul style="list-style-type: none"> • Alcohol-related traffic (42%) • Traffic deaths (25%) • Injuries/crash (5%) • Reduction in DUI, speeding • Increase in seat belt use
Center for Substance Abuse Prevention (CSAP) (Kaftarian, 2000; Yin et al., 1997)	<ul style="list-style-type: none"> • Reduce alcohol and illegal drug use 	<ul style="list-style-type: none"> • \$350 grants per year • Executive committee mobilized and trained volunteers • Needs assessment • Medical campaigns; community, school and cultural events • Employment and workplace program • Policy and regulatory changes 	Community mobilization	Quasi-experimental 24/251 communities randomly selected for comparison with matched control community surveys; adults, 8th and 10th graders	<ul style="list-style-type: none"> • CSAP communities had greater declines (3-5%) in: <ul style="list-style-type: none"> • Alcohol and illicit drug use 8th graders • Illegal drug use 10th graders • Adult illicit drug and alcohol use • No change females; 8/24 communities showed change

identification of youthful-appearing alcohol purchasers and a 24% decline in sales to potential underage purchasers by bars and restaurants. There was a 25% decrease in the proportion of 18- to 20-year olds seeking to buy alcohol, a 17% decline in the proportion of older teens who provided alcohol to younger teens and a 7% decrease in the percentage of respondents under age 21 who drank in the last 30 days. Among 18- to 20-year olds, there was also a significant decline in arrests for driving under the influence (Wagenaar et al., 2000b).

The *Community Prevention Trial Program* (Holder, 1997; Holder et al., 2000) was a 5-year initiative designed to reduce alcohol-involved injuries and death in three experimental communities. The program used five reinforcing components to change individual behavior by altering the environmental, social and structural contexts of alcohol use. First, community mobilization stimulated public policy interventions by increasing general awareness and concern about alcohol-related trauma. Program initiatives jointly

planned by project organizers and local residents were implemented by the residents. Media, mobilization and intervention activities had specific behavioral objectives tailored to each site. Second, a "responsible beverage server" component sought to reduce sales to intoxicated patrons and to increase local enforcement of alcohol laws by working with restaurants, bar and hotel associations, beverage wholesalers and the Alcohol Beverage Control Commission. Third, a driving-while-intoxicated (DWI) component sought to increase the number of DWI arrests by a combination of officer training, deployment of passive alcohol sensors and media publicized checkpoints. Fourth, media advocacy focused news attention on underage drinking; enforcement of underage sales laws was increased; and clerks, owners and managers were trained to prevent sales of alcohol to minors. Fifth, local zoning powers regarding alcohol outlet density were used to reduce availability of alcohol.

A quasi-experimental evaluation of intervention and comparison communities documented the effects of each

intervention as well as the overall project effects on alcohol-related injuries. During the study, local regulation of alcohol outlets and public sites for drinking changed in all three experimental communities. Compliance checks at 150 outlets where underage persons attempted to purchase alcohol revealed a significant reduction in alcohol purchase by youth.

The DWI reduction component resulted in an increase in news coverage of DWI, additional police enforcement and greater use of breath analyzer equipment. Telephone surveys revealed a significant increase in perceived likelihood of DWI arrest and a reduction in self-reported frequency of driving after drinking. Roadside surveys also revealed reduction in driving after drinking. Alcohol-related crash involvement as measured by single vehicle night crashes declined 10-11% more in the program group than the comparison communities. Alcohol-related trauma visits to emergency departments declined 43% (Holder et al., 2000).

The *Massachusetts Saving Lives Program* (Hingson et al., 1996) was a 5-year (1988-93) comprehensive community intervention designed to reduce alcohol-impaired driving and related traffic deaths. Six program communities were selected based on a competitive proposal process. These were compared with five matched communities whose applications also satisfied selection criteria but were not funded. The rest of Massachusetts also served as a comparison. Outcome data were collected for the period 5 years before and 5 years after the intervention.

In each program community, a full-time coordinator from the mayor's office organized a task force of concerned private citizens and organizations and officials representing various city departments (e.g., school, health, police and recreation). Each community received approximately \$1 per inhabitant per year in program funds. Half the funds were spent to hire the coordinator and the balance was for increased police enforcement and other program activities and educational materials. Voluntary activity was also encouraged. Active task force membership ranged from 20 to 100 persons in each community. An average of 50 organizations participated in each city.

Most initiatives were developed by the communities. The program sought to reduce drunk driving and related risky behaviors such as speeding, running red lights, failure to yield to pedestrians in crosswalks and failure to wear safety belts. To reduce drunk driving and speeding, communities introduced media campaigns, checkpoints, business information programs, speeding and drunk-driving awareness days, speed watch telephone hotlines, police training, high school peer-led education, Students Against Drunk Driving chapters, college prevention programs, alcohol-free prom nights, beer keg registration and increased liquor outlet surveillance by police to reduce underage alcohol purchase. To increase pedestrian safety and safety belt use, program communities conducted media campaigns and police checkpoints, posted crosswalk signs warning motorists of fines

for failure to yield to pedestrians, added crosswalk guards and offered preschool education programs and training for hospital and prenatal staff. Coordinators engaged in numerous media advocacy activities to explain trends in local traffic safety problems and strategies the communities were implementing to reduce traffic injury and death. The proportion of drivers under age 20 who reported driving after drinking in random digit dial telephone surveys declined from 19% during the first year of the program to 9% in subsequent years. There was little change in comparison areas. The proportion of vehicles observed speeding through use of radar was cut in half; there was also little change in comparison cities. There was a 7% increase in safety belt use, a significantly greater increase than found in the comparison area.

Fatal crashes declined from 178 during the 5 pre-program years to 120 during the 5 program years. This was a 25% greater reduction than in the rest of Massachusetts. Fatal crashes involving alcohol declined 42%, and the number of fatally injured drivers with positive blood alcohol levels declined 47% relative to the rest of Massachusetts (90% of fatally injured drivers in Massachusetts are tested annually for alcohol). Visible injuries per 100 crashes declined 5% more in the program than the rest of the state during the program period. The fatal crash declines were greater in program cities, particularly among younger drivers 15- to 25-years old. All six program cities had greater declines in fatal and alcohol-related fatal crashes than did comparison cities or the rest of the state. Interventions varied somewhat by community. This suggests that organizing the community program and combining environmental policy changes and enforcement with theory-based school education programs was more important than any specific initiative in contributing to program success.

In addition to the programs reviewed above, several large community intervention initiatives addressing alcohol and other drug use have been launched. The *Center for Substance Abuse Prevention* provided 251 cities with 5-year grants from 1990 to 1996 to organize community antidrug coalitions.

Awarded approximately \$350,000 per year, each program developed a steering committee, mobilized and trained volunteers, undertook a needs assessment of prevention services and developed a comprehensive prevention plan. Each also implemented media campaigns, community school and cultural events, alternate youth recreation activities, parent and family programs and employment and workplace programs. Policy and regulatory initiatives varied by community but included drug-free and smoke-free school, workplace and other location policies; heightened penalties for drug use possession; lower legal blood alcohol limits for adult and youth drivers; fines for selling alcohol and tobacco to youth; and an evaluation component to assess program implementation and impact on substance use.

Summary evaluations (Kaftarian, 2000; Yin et al., 1997) randomly selected 24 partnerships from a total of 251 and compared them with 24 nonpartnership communities matched on demographic characteristics. Repeat cross-sectional surveys were conducted with 83,473 randomly selected adults, tenth graders and eighth graders. Adults were surveyed at home, and youth were surveyed at school. Substance use rates were compared over an 18-month interval from 1994/1995 to 1996. In the partnership communities, male substance use rates were 3-5% lower at follow-up on five of six outcome measures of regular alcohol and illicit drug use.

When responses of males and females were combined, only one of six outcomes significantly favored the partnerships. This finding persisted with regressions controlling for age, gender and race. However, of the remaining 11 outcomes, all but the smallest were in the predicted direction favoring the community partnership program. When individual partnership-comparison communities were examined, 8 of 24 partnership communities showed some statistically significant reduction in substance use relative to their comparison communities.

Comprehensive Community Interventions to Reduce Behavioral Sexual Risks (Table 4)

The *Mpowerment Project* (Kegeles et al., 1996) was undertaken to reduce sexual risk taking among young gay men. A core group and a community advisory board ran the program. Young male peer outreach workers diffused safer sex messages developed by other volunteers at bars and community and special events and recruited other men into the project, who in turn conducted program outreach and education.

The teams also tried to create new events that would attract young gay men at which safer sex could be promoted. For example, the Mpowerment center offered weekly small group meetings; video, dance and open house parties; rap groups; drop-in hours; picnics; hikes; and bicycle rides. At least 500 men in the study community of Eugene, Oregon, attended these events. These group sessions were presented as a fun way for young gay men to meet other young gay men. Efforts were made to recruit 75-80% of young gay men in the community into the groups. Publicity included articles and advertisements in the gay newspaper.

TABLE 4. Comprehensive community programs to reduce sexual risk taking

Name of study	Behavioral targets	Intervention	Theoretical model	Research design	Results
Mpowerment Project (Kegeles et al., 1996)	Reduce HIV risk behavior among young gay men	<ul style="list-style-type: none"> Peer-led outreach-safe sex promotion Small groups and publicity Publicity campaign in gay press Care group and community elders advisory board Clear up misconceptions, eroticize safe sex 	Community mobilization	Quasi-experimental; Santa Barbara, CA compared with Eugene, OR	<ul style="list-style-type: none"> Unsafe anal intercourse declines from 41% to 30% No change in comparison communities 70% to 11% decline in primary partners 59% to 45% decline in other partners
CDC AIDS Community Demonstration Projects (CDC AIDS, 1999)	<ul style="list-style-type: none"> Reduce unprotected sex with main partner or other Reduce anal sex 	<ul style="list-style-type: none"> Mobilization of community members to distribute and verbally reinforce prevention messages Small media material featuring theory-based prevention messages Increased availability of bleach and condom kits 	Behavioral change theory Theoretical model of change	Quasi-experimental compared randomly allocated intervention comparison areas	<ul style="list-style-type: none"> Reduction in unprotected sex with main and nonmain partners No change in bleach use Increase in condom carrying
School/Community Program for Sexual Risk Reduction among Teens (Vincent et al., 1987)	<ul style="list-style-type: none"> Reduce unintended teen pregnancy and postpone initial voluntary sexual intercourse among never-married teens and preteens 	<ul style="list-style-type: none"> Mass media Education of adults Graduate courses for teachers on reproduction, family planning Parent-child interaction Self-esteem in youth Sex education K-12 Clergy and parents Local newspapers and radio promote the program 	Social learning theory	Quasi-experimental community vs other portion of community and other SC counties	<ul style="list-style-type: none"> Target areas: sharp reduction in pregnancies 60/1,000 females to 25/1,000
AIDS Prevention for Pediatric Life Enrichment Project (Santelli et al., 1995)	Prevent HIV infection in women	<ul style="list-style-type: none"> Select outreach controls and community-targeted small media Role model stories Condom distribution 	Social learning theory	Quasi-experimental	<ul style="list-style-type: none"> Increase 30% to 40% in condom use vs 22% to 27% in comparison communities No change in asking about a sex partner's STD history

Eugene was compared with Santa Barbara, California. Following the intervention, the proportion of men engaging in any unprotected anal intercourse decreased from 41% to 30%. It decreased from 70% to 11% with nonprimary partners and from 59% to 45% with boyfriends. No significant changes occurred in the comparison community.

The *CDC AIDS Community Demonstration Projects* (CDC AIDS Community Demonstration Projects Research Group, 1999) sought to reduce the risk of infection among active injection drug users, female sex partners of male injection drug users, female commercial sex workers, other women who trade sex for money or drugs, youth in high-risk situations, men who have sex with men and residents of census tracts with high rates of sexually transmitted diseases. All sites used a common intervention based on behavioral theories, study community ethnographic research and interventions in prior community studies. The intervention sought to mobilize community members to distribute and verbally reinforce prevention messages, create small media materials featuring theory-based prevention messages in role-model stories and increase availability of condoms and bleach kits. One thousand persons from targeted at-risk communities, other local residents and area business personnel who had regular contact with the targeted population were recruited and trained to distribute intervention materials from July 1991 to June 1994. A total of 585,000 small media materials were distributed containing authentic stories about people from the community who were changing behaviors. The stories emphasized stages of behavior change based on the transtheoretical model. A quasi-experimental cross-sectional design compared randomly allocated intervention and comparison areas. Anonymous field interviews were conducted in 10 cross-sectional waves from 1991 through 1994. Data from 15,205 interviews were analyzed.

By the end of the intervention, more than half the population had been reached by the intervention at least once in the prior 3 months. Significant increases in the intervention relative to the comparison communities were achieved in condom use with a main partner, in condom use with a nonmain partner and in the carrying of condoms.

The *School/Community Program for Sexual Risk Reduction among Teens* (Vincent et al., 1987) was initiated in the western portion of a South Carolina county in 1982 to reduce unintended pregnancies among never-married teens and preteens. It promoted postponement of initial voluntary sexual intercourse and consistent use of effective contraception. Intervention strategies included increasing decision-making skills; improving interpersonal communication skills; enhancing self-esteem; aligning personal values with those of the family, church and community; and increasing knowledge of human reproductive anatomy, physiology and conception.

Adults in the community were trained initially. Two-thirds of district teachers, administrative staff and special service personnel completed at least one university course related to facets of sex education. The trained teachers assisted the project staff in implementing sex education in all grades (kindergarten-12), beginning in 1983. Teachers integrated units of instruction within their biology science and social studies classes. Clergy, church leaders and parents were recruited to attend five-session minicourses with much the same content as given to teachers. Local newspapers and radio promoted program messages. Messages on alcohol, drug abuse, nutrition and smoking were also integrated into the program.

The intervention county was compared with four other counties with similar demographics. The rate of pregnancies per 1,000 females was recorded among females ages 14-17 in each community. Rates prior to the intervention from 1981-1982 were compared with intervention years 1984-1985. There was a sharp reduction during the program period in pregnancies in the target relative to comparison areas: from 60 in 1,000 females to 25 in 1,000 in 1984-1985.

The *AIDS Prevention for Pediatric Life Enrichment Project* (Santelli et al., 1995) was a community-based program to prevent prenatal HIV infection in women that used street outreach and targeted small media to promote condom use. Based on social learning theory, small media publicized HIV risk-reduction messages (e.g., condom use) in the form of role model stories. Stories drawn from focus groups on experiences of persons in the target audience were put into comic books, newsletters, pamphlets and condom envelopes. Three full-time paid street outreach workers and volunteers contacted community residents on street corners, in local shopping areas and through community agencies. In the quasi-experimental time series design, 500 or more face-to-face interviews using a modified street intercept approach were conducted annually in intervention and comparison communities.

Between October 1990 and May 1992, 26,461 street outreach contacts, 26,020 media materials and 65,217 condoms were distributed. The program's name was known by 40% of the respondents by 1992; 36% had contact with street workers. Condom use increased significantly more (from 30% to 40%) in intervention communities than in the comparison communities (from 22% to 27%). No differences, however, occurred over time with respect to inquiring about a sexual partner's history of sexually transmitted disease, rejecting sex for fear of a disease or avoiding sexual contacts when usual partners were not available.

Conclusions

From this review of comprehensive community interventions, several conclusions can be drawn that may have

relevance for college interventions to reduce alcohol-related problems. First, these studies indicate this approach can be effectively applied to a variety of public health problems. Comprehensive community programs consistently yielded significant reductions in alcohol use or related problems.

Second, these studies indicate that health-related behavioral change can be accomplished among college-age adolescents and young adults. The majority of programs (although not all) targeting youth achieved changes in the desired direction. Programs targeting middle-age adults (e.g., the cardiovascular risk reduction programs) had the least differential success, but were implemented in a context of widespread secular changes on program outcomes as were seen in comparison communities. Indeed, in some respects, young people who are in the process of adopting behaviors and lifestyles may be more receptive to intervention than more habituated adults. Moreover, adolescents and young adults may be more sensitive to shifts in behavioral norms because their primary social units involve friends and acquaintances rather than spouses and children. Those strategies aimed at norm change and diffusion of innovation may be more effective in college settings than in more diverse communities because students at a given campus will share a range of characteristics and attributes. Accordingly, the community intervention approach might be specifically appropriate for college intervention programs.

Third, programs are more likely to succeed if they combine environmental and institutional change with theory-based education interventions designed to change individual behavior. This is particularly pertinent to colleges because the administration has influence over aspects of the campus' physical and social environments and many colleges have researchers who are familiar with theory-based educational strategies to promote behavior change.

Fourth, programs that involve community ownership appear to succeed more often than programs imported into the community from the outside. Community development requires a matrix of local organizations and institutions, both public and private. Although these entities are part of most municipalities, colleges also have extensive networks of campus-based student organizations concerned with student life. Accordingly, college administrators desiring collaboration with students around alcohol interventions should have no problem identifying and tapping into student organizations willing to contribute.

Comprehensive community interventions to reduce college alcohol-related problems have not yet been evaluated. A multicomponent college program, which was implemented in the 1980s, achieved little discernible impact (Kraft, 1988), but that program did not involve surrounding communities, public officials or private citizens (Hingson et al., 1997). Without involvement of the communities that surround colleges, intensive multifaceted efforts by colleges may drive

alcohol use into the community or may be undermined by alcohol availability and promotion in the community.

Many questions remain about how best to implement comprehensive college/community interventions to reduce drinking and alcohol-related problems. For example, it needs to be determined whether the behavioral focus should be on drinking practices only or the multiple problems alcohol-using college students pose for themselves and others. The literature on comprehensive community interventions seems to show the greatest impact when the behavioral targets are more focused rather than multifaceted, as were the cardiovascular risk reduction projects.

The locus of decision making and responsibility can vary from the community to colleges or both, and the implementation of this decision-making locus may influence the success of the program. The balance between governmental versus private organizational control or direction could also influence program success, but this has not been studied.

Identifying optimal strategies to mobilize communities for action warrants research attention. Wagenaar et al. (1999) outlined a specific process to mobilize communities that included (1) assessing community interests, (2) building a core base of support in the community, (3) expanding the base, (4) developing a plan of action, (5) implementing the plan, (6) maintaining the effort and institutionalizing it and (7) evaluating and disseminating results. Whether that plausible sequence is the optimal one to follow can be systematically tested. Similarly, the speed and breadth of recruitment into community task forces can be studied. Potential tradeoffs between smaller but more motivated and cohesive task forces versus larger more broadly representative but perhaps less unified work groups can be explored.

The role of evaluators in identifying program interventions needs to be assessed. Many of the projects reviewed in this article had evaluators who actively engaged in problem identification and feedback to the communities being studied about their progress (or lack thereof) in meeting program objectives. How directive program evaluators should be in the process of selecting or modifying program initiatives warrants study. On the one hand, evaluators may have greater access to scientific evaluations of interventions. On the other hand, evaluators may not have as clear an understanding as community members regarding the feasibility of adoption and implementation of specific interventions. Also community ownership in selecting interventions may yield greater motivation to implement them vigorously.

The role of students in formulating and implementing comprehensive programs also deserves research attention. Peer-led educational interventions have shown consistent success among middle and high school students. For example, in Project Northland, peers who participated in planning alcohol-free social events reported less drinking than

did nonparticipants (Komro et al., 1996). Whether similar results will apply among colleges and universities has yet to be determined.

Some interventions, such as Project Northland, involved youth in policy-setting activities. Whether students will be more supportive and compliant with policies they had a role in defining warrants research attention. Whether they will arrive at different and perhaps more effective policy decisions than would city officials or campus administrators also is unknown.

Legal and environmental interventions that influence access to alcohol and enforce laws governing behavior after drinking such as drunk-driving laws have had an influence on college-age persons. Interventions targeting individual knowledge and behavior change have also produced behavior changes, particularly among youth. Comprehensive community college intervention programs may want to include both types of activities. The best balance has yet to be determined. Whether they will produce additive or interactive effects needs to be studied.

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