Community Health Improvement Research

The Kaiser Family Foundation Community Health Promotion Grants Program: Findings from an Outcome Evaluation

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Objectives. To present results from an outcome evaluation of the Henry J. Kaiser Family Foundation's Community Health Promotion Grants Program (CHPGP) in the West, which represented a major community-based initiative designed to promote improved health by changing community norms, environmental conditions, and individual behavior in 11 western communities.

Methods. The evaluation design: 14 randomly assigned intervention and control communities, 4 intervention communities selected on special merit, and 4 matched controls. Data for the outcome evaluation were obtained from surveys, administered every two years at three points in time, of community leaders and representative adults and adolescents, and from specially designed surveys of grocery stores. Outcomes for each of the 11 intervention communities were compared with outcomes in control communities.

Results. With the exception of two intervention communities—a largely Hispanic community and a Native American reservation—we found little evidence of positive changes in the outcomes targeted by the 11 intervention communities. The programs that demonstrated positive outcomes targeted dietary behavior and adolescent substance abuse.

Conclusions. Improvement of health through community-based interventions remains a critical public health challenge. The CHPGP, like other prominent community-based initiatives, generally failed to produce measurable changes in the targeted health outcomes. Efforts should focus on developing theories and methods that can improve the design and evaluation of community-based interventions.

Key Words. Health promotion, community health services, consumer participation

Community-based health promotion interventions make great sense. They target the increased risk found in large proportions of the population (Kottke, Puska, Salonen, et al. 1985); use low-cost treatment methods, such as media presentations or legislative action; and mobilize the community around an issue of public health importance. Early evidence of success in Finland (Puska, Nissinen, Tuomilehto, et al. 1985) and by the Stanford Group (Farquhar, Maccoby, Wood, et al. 1977; Farquhar, Fortmann, Maccoby, et al. 1985) spurred further activity. The dramatic declines in the prevalence of risk factors such as smoking, inactivity, and dietary fat consumption over the past few decades offered further evidence that changes in social norms and the environment, not individual risk reduction treatments, were influencing Americans to change their behaviors. Social learning theory (Bandura 1977) provided strong intellectual support for the role of social norms and the environment in behavior and behavior change. Their intuitive appeal, basis in theory, and low cost have made community-based programs a popular public health strategy.

But the popularity of the approach stands in contrast to evidence that has shown little effect on targeted risk factors. Four well-tested programs, the Stanford Five City Study (Farquhar, Fortmann, Flora, et al. 1990), the Minnesota Heart Health Program (Luepker, Murray, Jacobs, et al. 1994; Mittelmark, Luepker, Jacobs, et al. 1986), COMMIT (Community Intervention Trial for Smoking Cessation) (COMMIT Research Group 1995a,b) and

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the Pawtucket Heart Health Program (Carleton, Lasater, Assaf, et al. 1995) recently reported their final results. The Minnesota and Pawtucket programs reported essentially no differences in risk factors between intervention and control communities. The Stanford study reported limited effects for selected subgroups. The COMMIT program achieved no higher rates of cessation among heavy smokers, their primary targets, in the intervention communities than in control sites, but they did find a modest increase in cessation among lighter smokers in the intervention communities. These generally discouraging new findings have stimulated thoughtful reappraisals of the state of the art (Fisher 1995; Susser 1995; Green and Kreuter 1993).

Most published community health promotion programs have targeted a single disease and have been initiated "top-down," often with a university-based group in charge. The Kaiser Family Foundation's Community Health Promotion Grants Program in the western United States (CHPGP) followed a different approach. The CHPGP provided financial support and technical assistance to local coalitions and staff in grantee communities for the development of programs to reduce several health problems: substance abuse, adolescent pregnancy, cardiovascular disease, cancer, and injury. A Health Promotion Resource Center at Stanford University provided technical support, but program development and design was generally under local control (Tarlov, Kehrer, Hall, et al. 1987). Therefore, this was not a formal experiment in which communities were expected to adhere rigidly to guidelines. The Foundation gave grantees substantial flexibility to develop program targets and activities tailored to meet local needs and priorities. The intervention model (Tarlov, Kehrer, Hall, et al. 1987; Syme 1976; Green and Raeburn 1988) gave emphasis to activating communities by developing consensus and coordinated action among key organizations and groups in each community through involvement in a coalition.

Eleven communities were funded for the five-year period, 1987–1992. In this article, we compare changes in community activation, community norms and environments, and health-related behaviors over time in these 11 communities with changes in comparison communities.

METHODS

Programs

The 11 funded communities included three rural/suburban counties, two Native American regions or reservations, four cities, and two states in the

western United States. More complete descriptions of the communities and programs are available in an earlier publication (Wickizer, Wagner, Cheadle, et al. 1998) Table 1 summarizes the health and behavioral goals and the major intervention strategies of each of the programs. To ensure confidentiality, we refer to the communities as "A," "B," and so on. Programs that targeted adolescents tended to emphasize school-based interventions that included curricula, peer programs, and special events like alcohol-free parties. The intervention strategies used by communities targeting adult health problems varied with the health target. For example, the program addressing senior injuries focused on home modifications, and those trying to reduce dietary fat consumption gave emphasis to working with supermarkets and cafeterias. All programs used media to varying degrees but never to the extent used in the media campaigns of the Stanford community cardiovascular disease prevention programs (Farquhar, Fortmann, Maccoby, et al. 1985; Farquhar, Formann, Flora, et al. 1990). A major strategy employed by both statewide programs was the provision of "mini-grants" or small grants to local communities.

Evaluation Design

The design, data collection, and statistical methods (sample size estimation and analysis) used in the evaluation were described in detail previously (Wagner, Koepsell, Anderman, et al. 1991), and will be reviewed only briefly here. The Foundation wanted an independent outcome evaluation, and as a consequence the evaluation data were not shared with the communities during the intervention period. The evaluation design, illustrated in Figure 1, included 11 intervention and 11 control communities. Seven intervention communities and seven control communities were determined by random assignment of 14 finalist applicants to intervention and control groups. The randomization was stratified by type of community: urban areas, rural/suburban counties, and Alaska Native regions. The controls for each of the seven randomly selected communities consisted of all the control communities in that stratum. For each of two rural/suburban intervention counties, we added two pairs of matched control communities.

The Foundation funded four more communities—two states, a large metropolitan area, and a Native American reservation—because of special merit. To evaluate these four communities, we used various sources for control data within the constraints of the design. The metropolitan site was compared to the randomized urban control communities. We compared the two states with one another in that one targeted adolescent pregnancy while the other focused on the other health problems. In state J we also collected local

Table 1: Selective Descriptive Information on Intervention Programs

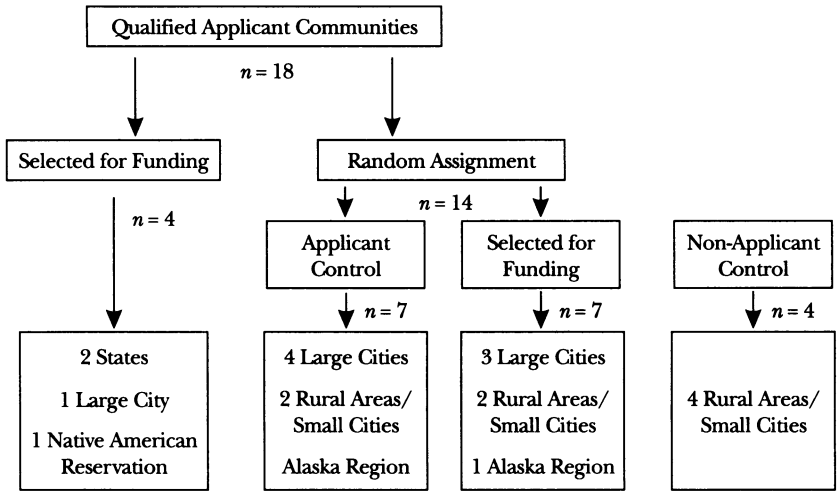
Community	*Health Target*	*Primary Interventions*
Suburban/Rural		
Community A	Cancer prevention	• Media campaign • Nutrition education campaign in grocery stores • Sting operations to reduce sale of tobacco to minors • Campaign to pass local ordinance banning cigarette vending machines
Community B	Substance abuse	• Parenting skills training • Life skills, sexuality, refusal-skills training • Peer leader/helper programs • Alcohol- and drug-free social events
Community C	Substance abuse	• School-based activities including life skills classes, teacher training, alcohol- and drug-free social events, and peer leader activities • Family-based activities including parenting classes, family annual conferences, and pledge program for alcohol-free homes
Urban		
Community D	Teen health	• Establishment of student-directed program boards in schools • Activation data to plan and develop interventions, including peer assistance and mental health initiatives
Community E	Injury prevention	• Home modifications for environmental safety • Review of prescription medications • Public advocacy of issues related to health and welfare of elderly
Community F	Teen pregnancy	• School curriculum health initiatives • Church-based health initiatives related to adolescent and teen health • Parental training classes • Community education and public awareness initiatives • Media campaign

continued

Table 1: *Continued*

Community	*Health Target*	*Primary Interventions*
Urban		
Community G	Cardiovascular disease Cancer prevention	• Community health screenings • School-based nutrition education • Community nutrition classes
Native American		
Community H	Substance abuse Teen pregnancy	• Village health educator program to place allied health personnel in remote villages • Resource center to distribute health education materials • Assistance to school districts in developing and incorporating health teaching into the curriculum
Community I	Substance abuse	• School-based youth activities, including social- and refusal-skills training, peer counseling programs, and drug-free activities • Family resource center for parent/youth education training • Community education activities to promote awareness of substance abuse problems, to establish codes regarding control of alcohol/drug abuse, and to improve law enforcement
State Programs		
Community J	Teen pregnancy	• Mini-grants to support local programs • Public awareness
Community K	Multiple health practices	• Mini-grants to support local programs • Needs assessments protocol development and dissemination • Worksite exercise

Figure 1: Overall Evaluation Design



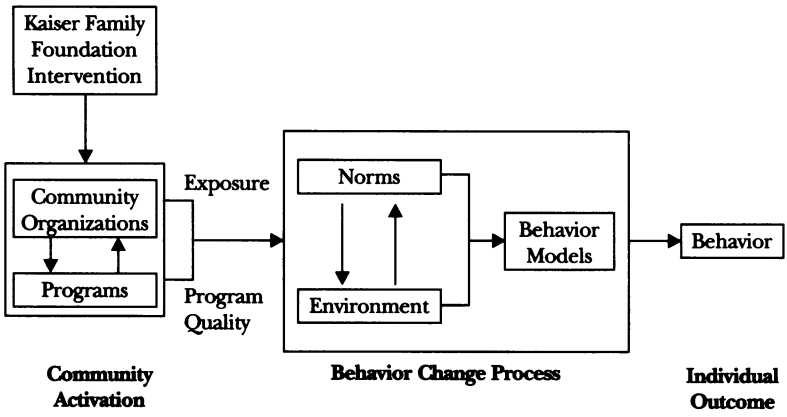
information in one county, funded through a mini-grant, that was compared with the two matched rural control communities in which adolescent surveys were conducted. The selection of a control group for the Native American reservation was the most problematic. For this program, which targeted adolescents, we compared the data from Native American adolescents in the target area with data from white adolescents living in the same area and with adolescents in two of the matched rural control counties.

The evaluation was guided by an explicit model (Figure 2) that described our hypothesized sequence of steps between funding and the improvement of health (Wagner, Koepsell, Anderman, et al. 1991; Cheadle, Psaty, Diehr, et al. 1993). The model posits that effective programs will activate the community and develop interventions with broad population exposure that will lead to changes in community norms and environments and, ultimately, in individual behaviors.

Data Collection

Data collection in the 22 communities was determined by the particular age group and health problem being addressed and by the specific circumstances in each community. Data were collected in three waves in 1988 (t_0), 1990 (t_1) and 1992 (t_2).

Figure 2: Conceptual Framework for Evaluating the Community Health Promotion Grants Program



The Community Activation Survey involved a cohort of representatives of key community organizations identified through reputational sampling methods (Wickizer, Von Korff, Cheadle, et al. 1993; Laumman and Pappi 1976). We initially identified 17–47 informants per community. Of those sampled, 720 (94 percent) completed baseline interviews. Those remaining in their original organizations were resurveyed at t_1 and t_2. Those respondents who left the organization were replaced. Response rates at t_1 and t_2 exceeded 90 percent.

The survey included ten-item scales asking respondents to rate on a scale from 1 to 5 various aspects of health promotion activities in their community for adolescent and adult health promotion in general and for specific health target areas (substance abuse, adolescent pregnancy, tobacco use, cancer, and cardiovascular disease) about which they were knowledgeable. Areas rated by respondents included leadership, awareness, program coordination, funding, and program availability. Total scores ranged from 10 to 50 with higher scores indicating greater activation.

The Adult Survey consisted of random-digit-dialing telephone surveys of fresh cross-sectional samples and cohorts of adults ages 18 and older who resided in the community (Wagner, Koepsell, Anderman, et al. 1991; Curry, Wagner, Cheadle, et al. 1993; Psaty, Cheadle, Koepsell, et al. 1994). At each of the three survey occasions, we used the Waksberg method of selecting telephone numbers to identify a sample of households. A screening interview enumerated household members from whom one adult 18 years

or older was randomly selected for interviewing. In the one intervention community that targeted injury prevention in elderly persons and in its control communities, we used commercially available mailing lists to generate samples of households containing at least one person over 60 years of age (Psaty, Cheadle, Curry, et al. 1991). In each community, between 500 and 1,000 adults were interviewed for each cross-sectional survey. The response rates for the cross-sectional surveys were 70–75 percent for the screening interview and 70–75 percent for the individual interview, for an overall response rate of approximately 50 percent. In addition, respondents from the t_0 survey served as a cohort and were resurveyed at t_1 and t_2. Cross-sectional survey and cohort findings did not differ importantly in the direction or magnitude of intervention-comparison difference, so only cross-sectional results are presented in this article.

The survey, using well-tested items and scales, assessed community norms, aspects of the environment, and behaviors associated with smoking, substance abuse, injuries, cardiovascular disease, and cancer. The Behavioral Risk Factor Survey questionnaire (Marks, Hogelin, Gentry, et al. 1985) served as the major source of items.

The Adolescent Survey was a school-based, self-administered questionnaire that gathered information about health-related attitudes and behaviors, particularly sexual activity and the use of alcohol and drugs (Wagner, Koepsell, Anderman, et al. 1991; Anderman, Cheadle, Curry, et al. 1995). The major sources of items were major national surveys, Monitoring the Future (Johnston, O'Malley, and Bachman 1987) for substance abuse, and the National Survey of Family Growth (National Center for Health Statistics: Bachrach et al. 1985) for sexual behavior and contraceptive use. We surveyed all available ninth and twelfth graders in randomly sampled public and private schools where at least 50 percent of enrolled students resided in the community as defined by the program. We surveyed ninth and twelfth graders at each wave in order to detect the effects of interventions offered in elementary, junior high, or high school on attitudes and behaviors. The total number of students in both grades surveyed per community ranged from 150 to over 3,000 on each survey occasion. Each survey was cross-sectional in both intervention and control communities as twelfth graders should not have been interviewed as ninth graders.

The Supermarket Survey involved site visits to randomly sampled stores that had two or more checkout stands, carried fresh produce and fresh meat, and were listed in the Yellow Pages telephone directory (Cheadle, Psaty, Wagner, et al. 1990). Approximately 15 stores per community were surveyed at t_0, and randomly sampled new stores were added to the original sample

at t_1 and t_2. The survey protocol recorded the presence or absence of health education displays or efforts and the relative amount of shelf space occupied by low-fat and high-fiber products.

Statistical Analysis

Because of the heterogeneity of programs, the analytic strategy compared each intervention community with its set of controls ($n = 1$–4) on a variety of outcome measures. However, the large number of outcomes measured increased the likelihood that statistically significant results would be found by chance alone. To reduce the impact of type I errors and type II errors, we adopted a two-step approach for assessing program impact in each community.

Step 1. Before looking at the outcome data, we reviewed available information about each program—its objectives, behavioral priorities, target populations, and intervention activities—to generate hypotheses about the outcome measures that were most likely to show improvement if the program was effective.

Step 2. We then examined the outcome data in light of the hypotheses generated in Step 1. Since communities were the units of randomization, we used community-level analysis to test for program effects (Koepsell, Martin, Diehr, et al. 1991). Community means were computed for each variable of interest at each time point (t_0: 1988, t_1: 1990, t_2: 1992). A separate ordinary least squares regression line was fitted for each community across the three time points. We then computed a *t*-statistic to compare treatment and control regression slopes, using the distribution of slopes among the control communities to obtain an estimate of variance.

To show the magnitude of program effect, we used a unit-free measure of effect for each variable—the relative effect—defined as the change from t_0 to t_2 in the treatment community minus the average t_0 to t_2 change in the control communities, divided by the t_0 value in the treatment site. This relative effect measure represents the improvement in the treatment community, net of concurrent changes in the control communities, expressed as a percent of its baseline.

RESULTS

Table 2 summarizes changes in the ten-item community activation ratings for the targeted health problems and for general health promotion activities for

either adults or adolescents in intervention and control communities. For each activation scale examined the table shows the baseline and final (t_2) means for the intervention and control communities, the slopes of the regression line fitted to the three time points, and the p-value for the t-test comparing the slopes. The final column shows the relative effect of the intervention on that variable. Relative effects have been calculated so that they are positive if the changes in the intervention community were more healthful than those in the comparison communities. In the intervention and control communities overall, slopes were close to zero and were as often negative as positive. None of the intervention-control differences in slopes reached statistical significance. Thus, we found no evidence that community health leaders perceived major changes in health promotion awareness, commitment, or activities.

Three programs targeted the use of drugs and alcohol among young people: communities B, C, and I. The three featured school-based training in life skills and refusal skills, peer leader programs, and drug/alcohol–free events. All had educational activities for parents as well as public awareness campaigns. We examined their effects on the norms and behaviors related to marijuana use and heavy alcohol consumption (binge drinking) among adolescents. The norms questions on the adolescent survey assessed the extent of disapproval of the behaviors. Table 3 shows the data separately for ninth and twelfth graders.

The majority of adolescents in all intervention and control communities expressed disapproval of marijuana use or heavy drinking. Ninth graders were more likely to be disapproving than twelfth graders, and adolescents in community C (with a large Mormon population) were most likely to disapprove of these behaviors. The endorsement of these norms did not change significantly or consistently over time in the intervention communities relative to controls.

The prevalence of binge drinking decreased over time (negative slopes) in the three intervention communities, but also in their control communities. No significant differences between intervention and control communities showed up in the rate of decline. The declines for adolescents in community I (a Native American reservation) were substantial but not significantly greater than in the control communities. However, Native American adolescents living on or near the community I reservation showed declines in marijuana use over time that were significantly greater than among controls for ninth graders, although they began with much higher baseline levels of use.

Two programs, in communities A and G, targeted dietary factors in the prevention of cancer and cardiovascular disease. Relevant environmental

Table 2: Changes in Community Activation, Intervention Versus Control Communities

Variable/Community	Baseline		t_2 Values *		Slopes †		p-Value ‡	Relative Effect §
	Intervention	Control	Intervention	Control	Intervention	Control		
Adolescent: Drugs								
Community B								
Alcohol and drug use	34.2	33.2	38.0	30.7	1.88	−1.27	.09	18.4
Adolescent health	35.5	29.2	34.0	30.5	−0.75	0.66	.41	−7.9
Community C: (one county)								
Alcohol and drug use	35.4	33.2	33.3	30.7	−1.05	−1.27	.85	1.2
Adolescent health	34.7	29.2	34.4	30.5	−0.16	0.66	.61	−4.7
Community C: (one county)								
Alcohol and drug use	31.0	33.2	30.4	30.7	−0.3	−1.27	.46	6.1
Adolescent health	30.8	29.2	31.0	30.5	0.11	0.66	.73	−3.5
Community I: (one county)								
Alcohol and drug use	28.8	33.0	24.4	30.1	−2.19	−1.46	.70	−5.1
Adolescent health	28.6	29.4	29.0	30.0	0.21	0.30	.97	−0.6
Community D: (one county)								
Alcohol and drug use	29.7	29.7	28.6	31.6	−0.54	0.95	.42	−10.0
Adolescent health	33.1	28.9	31.6	29.6	−0.77	0.36	.16	6.8
Community H: (one county)								
Alcohol and drug use	29.6	30.4	31.5	24.0	0.96	−3.21	–††	28.2
Adolescent health	29.6	30.0	31.7	30.2	1.06	0.10	–	6.5

Adult: Diet Programs								
Community G								
Cancer/Cardiovascular disease	32.5	32.4	29.3	33.0	−1.58	0.31	.61	−11.6
Adult health	29.2	30.6	26.3	31.6	−1.46	0.49	.15	−13.4
Community A								
Cancer/Cardiovascular disease	31.6	35.0	29.0	33.6	−1.32	−0.71	.68	−3.8
Adult health	27.2	32.6	31.2	32.3	2.01	−0.16	.10	16.0
Adult: Senior Injury Prevention								
Community E								
Senior injuries	36.0	23.8	26.9	35.3	−4.55	5.77	−††	−57.3
Adult health	34.5	32.0	33.5	36.3	−0.51	2.16	–	−15.5
Teen Pregnancy								
Community J: (state overall)								
Teen pregnancy	30.9	34.9	29.1	29.4	−0.88	−2.73	−††	12.0
Adolescent health	29.1	32.1	31.0	31.8	0.97	−0.15	–	7.7
Community J: (one county)								
Teen pregnancy	35.0	27.2	29.0	29.5	−3.01	1.13	.56	−23.6
Adolescent health	32.2	29.4	32.1	30.0	−0.06	0.30	.87	−2.2
Community J								
Teen pregnancy	27.8	29.6	30.1	28.9	1.15	−0.37	.22	10.9
Adolescent health	28.4	28.9	27.2	29.6	−0.62	0.36	.21	−6.9
State: Multiple Health Targets								
Community K: (state overall)								
Alcohol and drug use	35.9	38.5	32.3	41.0	−1.82	1.25	−†	−17.1
Tobacco	32.4	32.8	38.0	30.3	2.79	−1.23	–	24.8
Teen pregnancy	34.9	30.9	29.4	29.1	−2.73	−0.88	–	−10.6
Cancer/Cardiovascular disease	32.9	32.6	35.8	30.6	1.46	−0.99	–	14.9
Adult health	32.3	29.8	31.8	32.8	−0.27	1.48	−††	−10.8
Adolescent health	32.1	29.1	31.8	31.0	−0.15	0.97	–	−7.0

continued

Table 2: *Continued*

Variable/Community	*Baseline*		t_2 *Values* *		*Slopes* †		p-*Value* ‡	*Relative Effect* §
	Intervention	*Control*	*Intervention*	*Control*	*Intervention*	*Control*		
Community K: (one county)								
Tobacco	23.9	28.5	20.0	29.5	−1.94	0.50	–††	−56.0
Alcohol and drug use	32.4	33.0	33.0	30.1	0.30	−1.46	.44	10.8
Adult health	31.0	30.3	28.8	29.4	−1.09	−0.46	.28	−4.1
Adolescent health	32.1	29.4	31.8	30.0	−0.16	0.30	.83	−2.9

Notes: Values in the table are based on a series of ten scale items where respondents rated their community on leadership, awareness, political support, planning, coordination, publicizing programs, funding, program availability, program utilization, and matching programs to needs. The response categories were (1) = very weak, (2) = weak, (3) = neutral, (4) = strong, (5) = very strong. Respondents were asked to rate their community on specific health targets (e.g., alcohol and drug use) as well as on adult and adolescent health overall.

*Mean value for each variable. Control community mean is the average of community-level means.

†Slope is the time coefficient for an ordinary least squares regression line fitted for each community across the three time points. For the control communities the slope is the average slope across the communities.

‡ *P*-value for *t*-test comparing intervention and control slopes.

§"Relative effect" is a unit-free measure of program effect, defined as the change from t_0 to t_2 in the treatment community minus the $t_0 - t_2$ change in the control, divided by the baseline value in the treatment. A "plus" indicates that the effect favored the intervention community in the health promoting direction.

††*P*-values are missing ("–") when only one control community was available.

Table 3: Changes in Selected Measures of Drug and Alcohol-related Attitudes and Behavior for Programs Targeting Adolescent Substance Abuse

Variable/Community	*Baseline*		t_2 *Values* *		*Slopes* †		p-*Value* ‡	*Relative Effect* §
	Intervention	*Control*	*Intervention*	*Control*	*Intervention*	*Control*		
Community B								
Percent who disapprove of trying marijuana								
9th grade	69.1	67.5	64.3	71.3	−2.38	1.89	.26	−12.4
12th grade	53.8	54.1	51.7	60.1	−1.03	2.98	.47	−14.9
Percent who disapprove of binge drinking								
9th grade	70.8	67.5	73.7	69.5	1.47	1.01	.88	1.3
12th grade	64.0	53.0	63.2	66.6	−0.41	6.80	.35	−22.5
Behaviors (%)								
Binge drinking								
9th grade	26.4	23.7	19.0	17.1	−3.72	−3.28	.80	3.3
12th grade	34.1	40.1	27.3	26.4	−3.41	−6.86	.65	−20.2
Used marijuana in the past month								
9th grade	10.1	13.9	16.9	10.1	3.39	−1.88	.31	−104.1
12th grade	19.6	18.4	21.4	15.5	0.90	−1.46	.46	−24.1

continued

Table 3: *Continued*

Variable/Community	*Baseline*		t_2 *Values* *		*Slopes* †		p-*Value* ‡	*Relative Effect* §
	Intervention	*Control*	*Intervention*	*Control*	*Intervention*	*Control*		
Community C								
Percent who disapprove of trying marijuana								
9th grade	83.6	67.5	82.5	71.3	−0.53	1.89	.47	−5.8
12th grade	68.1	54.1	72.6	60.1	2.27	2.98	.89	−2.1
Percent who disapprove of binge drinking								
9th grade	79.2	67.5	85.3	69.5	3.06	1.01	.52	5.2
12th grade	67.8	53.0	77.6	66.6	4.90	6.80	.78	−5.6
Behaviors (%)								
Binge drinking								
9th grade	15.8	23.7	12.5	17.1	−1.65	−3.28	.40	−20.7
12th grade	21.3	40.1	19.7	26.4	−0.80	−6.86	.46	−56.9
Used marijuana in the past month								
9th grade	7.7	13.9	4.2	10.1	−1.76	−1.88	.98	−3.1
12th grade	8.8	18.4	12.4	15.5	1.80	−1.46	.34	−74.5

continued

Table 3: *Continued*

Community I								
Percent who disapprove of trying marijuana								
9th grade	59.8	74.7	61.3	77.7	0.74	1.67	.86	−3.1
12th grade	52.0	57.8	64.4	67.9	6.18	5.05	.74	4.3
Percent who disapprove of binge drinking								
9th grade	55.3	64.6	73.3	67.2	9.00	1.30	.29	27.9
12th grade	67.0	48.2	57.8	66.4	−4.58	9.09	.25	−40.8
Behaviors (%)								
Binge drinking								
9th grade	40.5	25.2	27.7	17.7	−6.38	−3.76	.38	13.0
12th grade	52.1	45.5	33.1	25.6	−9.51	−9.97	.92	−1.7
Used marijuana in the past month								
9th grade	42.1	9.0	29.3	9.1	−6.39	0.06	.05	30.6
12th grade	50.6	16.7	28.1	11.7	−11.26	−2.48	.17	34.7

Notes: Data are from a school-based survey of ninth and twelfth graders.

*Mean value for each variable. Control community mean is the average of community-level means.

†Slope is the time coefficient for an ordinary least squares regression line fitted for each community across the three time points. For the control communities the slope is the average slope across the communities.

‡*P*-value for *t*-test comparing intervention and control slopes.

§"Relative effect" is a unit-free measure of program effect, defined as the change from $t_0 - t_2$ in the treatment community minus the $t_0 - t_2$ change in the control, divided by the baseline value in the treatment. This gives the relative improvement in the treatment community, expressed as a percent of its baseline. Signs were chosen so that a "plus" indicates that the effect favored the intervention community in the health-promoting direction.

**"Binge drinking" is five or more drinks on an occasion in the last two weeks.

and behavioral outcome variables for these communities and their controls are shown in Table 4 and described in the table's footnotes. An increasing proportion of adults (positive slope) surveyed in community G indicated that restaurants and supermarkets in their community pointed out low-fat choices over time. These increases, relative to the controls, reached statistical significance for restaurants and approached it for groceries. The views of adults in community A and in the control communities changed minimally over the same interval. Supermarket surveys in all communities revealed an increasing percentage of low-fat dairy products over time. The increase was largest in community G although not significantly so. The percentage of the meat display devoted to red meat actually increased in community G and declined in community A relative to controls, but the differences were not statistically significant.

Several dietary behavioral variables from the adult survey were examined. In general, reported behaviors related to fat consumption improved in all communities. The percent of calories from fat and the number of days on which red meat was consumed decreased over time in all communities, but the intervention-control differences in slopes were not significant. A much lower percentage of community G respondents reported use of low-fat dairy products at baseline, and although this percentage increased at a greater rate than in the control communities, the difference was not significant. Little change occurred in the reported consumption of fruits and vegetables over time, although the decline in community G was significantly different than the slight increase in the control communities.

Two programs, F and J, attempted to reduce teen pregnancy. We were able to collect adolescent data only in community J, a state-level program providing financial and technical support to interested local communities. Table 5 compares norms and behaviors related to adolescent sexuality and contraceptive use in one county supported by state J and in comparison communities. The reported prevalence of sexual activity declined over time in all communities, while use of legitimate birth control was more variable. No consistent or significant differences were found between intervention and comparison communities in norms or behaviors.

Community E targeted injuries in seniors. The adult survey in community E and its control communities included items about home safety hazards (e.g., absence of grab-bars in the bath) and falls. As shown in Table 5, the prevalence of home hazards or falls showed little change over time in intervention or control communities, and no significant differences appeared in slopes.

Table 4: Changes in Outcome Measures for Program Targeting Diet

Variable/Community	Baseline		t_2 Values *		Slopes †		p-Value ‡	Relative Effect §
	Intervention	Control	Intervention	Control	Intervention	Control		
Community G: Diet								
Environment, scale of agreement (1–5):**								
Restaurants have low-fat items	2.6	2.7	2.9	2.7	0.15	0.01	.01	10.7
Supermarkets point out low-fat foods	2.7	2.8	3.0	2.8	0.13	0.02	.08	8.0
Behaviors								
Percent calories from fat	36.0	35.7	35.5	34.9	−0.27	−0.41	.72	−0.8
Days eating red meat as main meal	2.7	2.5	2.6	2.4	−0.06	−0.05	.92	1.0
Percent who drink low-fat milk	43.3	69.7	60.3	76.2	8.50	3.24	.19	24.3
Fruit and vegetable scale (0–5)††	2.5	2.3	2.3	2.4	−0.11	0.03	.01	−10.8
Grocery store indicators								
Percent red meat	60.1	62.1	63.4	58.3	1.67	−1.91	.27	−11.9
Percent low-fat milk	43.9	58.5	62.6	68.1	9.37	4.78	.23	20.9
Community A: Diet								
Environment, scale of agreement (1–5):								
Restaurants have low-fat items	2.6	2.6	2.7	2.7	0.03	0.04	.72	−1.2
Supermarkets point out low-fat foods	2.8	2.7	2.8	2.8	0.02	0.04	.28	−1.3
Behaviors								
Percent calories from fat	36.7	35.4	36.2	34.7	−0.23	−0.35	.76	−0.7
Days eating red meat as main meal	2.7	2.5	2.6	2.4	−0.03	−0.06	.65	−2.0
Percent who drink low-fat milk	66.2	69.7	70.0	73.7	1.89	2.00	.98	−0.3
Fruit and vegetable scale (0–5)††	2.4	2.6	2.2	2.5	−0.09	−0.03	.09	−5.0

continued

Table 4: *Continued*

Variable/Community	*Baseline*		t_2 *Values* *		*Slopes* †		p-*Value* ‡	*Relative Effect* §
	Intervention	*Control*	*Intervention*	*Control*	*Intervention*	*Control*		
Grocery store indicators								
Percent red meat	65.7	61.4	59.2	61.5	−3.23	0.07	.14	10.1
Percent low-fat milk	55.3	62.8	66.5	70.7	5.59	3.97	.68	5.9

Notes: Data for diet and injuries are from a telephone survey of adult community residents (cross-sectional sample) except for the "grocery store indicators," which are based on the in-store measurement of shelf space devoted to various products.

*Mean value for each variable. Control community mean is the average of community-level means.

†Slope is the time coefficient for an ordinary least squares regression line fitted for each community across the three time points. For the control communities the slope is the average slope across the communities.

‡*P*-value for *t*-test comparing intervention and control slopes.

§"Relative effect" is a unit-free measure of program effect, defined as the change from $t_0 - t_2$ in the treatment community minus the $t_0 - t_2$ change in the control, divided by the baseline value in the treatment. This gives the relative improvement in the treatment community, expressed as a percent of its baseline. Signs were chosen so that a "plus" indicates that the effect favored the intervention community in the health-promoting direction.

**Four-point scale of agreement/disagreement with the statement: "Supermarkets point out foods that are low in fat." 1 = strongly disagree, 2 = disagree, 3 = agree, 4 = strongly agree.

††Number of servings of fruits and vegetables eaten yesterday (0–5). Based on four questions about foods eaten yesterday: green salad, vegetable at lunch, vegetable at dinner, and two-plus servings of fruit (question about two-plus servings of fruit counted as two).

Table 5: Changes in Outcome Measures for Program Targeting Senior Injuries and Teen Pregnancy

Variable/Community	Baseline		t_2 Values *		Slopes †		p-Value ‡	Relative Effect §
	Intervention	Control	Intervention	Control	Intervention	Control		
Community E: Injuries								
Percent without a grab bar in shower	63.5	66.6	60.7	64.4	−1.39	−1.11	0.93	0.9
Number of rugs without non-slip backing	0.6	0.7	0.7	0.8	0.04	0.04	0.93	2.6
Percent who fell to the floor in the past year	11.5	8.1	11.5	8.2	0.01	0.03	0.99	0.3
Percent who fell in the tub in the past year	1.2	0.9	1.8	0.7	0.29	−0.12	0.15	−65.9
Community J (one county): Teen Pregnancy								
Norms/Environment								
Percent who disapprove of sex during high school								
9th grade	32.8	39.8	36.6	33.4	1.88	−3.19	0.35	30.8
12th grade	23.5	16.6	28.6	27.3	2.53	5.33	0.62	−23.9
Percent who say there is not enough information about sex								
9th grade	34.2	35.8	44.6	32.4	5.18	−1.72	0.58	−40.3
12th grade	47.9	45.2	49.1	36.2	0.60	−4.48	0.67	−21.2
Behaviors								
Percent who have ever had sex								
9th grade	45.5	33.4	44.0	31.4	−0.75	−1.01	0.95	−1.1
12th grade	75.0	71.4	72.0	63.1	−1.49	−4.16	0.67	−7.1

continued

Table 5: *Continued*

Variable/Community	*Baseline*		t_2 *Values* *		*Slopes* †		p-*Value* ‡	*Relative Effect* §
	Intervention	*Control*	*Intervention*	*Control*	*Intervention*	*Control*		
Percent who used birth control last time								
9th grade	14.4	18.3	14.9	12.0	0.24	−3.17	0.75	47.1
12th grade	34.9	28.3	23.2	22.2	−5.86	−3.06	0.64	−16.0

Notes: Data for injuries are from a telephone survey of adult community residents (cross-sectional sample). Data for teen pregnancy are from a school-based survey of ninth and twelfth graders.

*Mean value for each variable. Control community mean is the average of community-level means.

†Slope is the time coefficient for an ordinary least squares regression line fitted for each community across the three time points. For the control communities the slope is the average slope across the communities.

‡*P*-value for *t*-test comparing intervention and control slopes.

§"Relative effect" is a unit-free measure of program effect, defined as the change from $t_0 - t_2$ in the treatment community minus the $t_0 - t_2$ change in the control, divided by the baseline value in the treatment. This gives the relative improvement in the treatment community, expressed as a percent of its baseline. Signs were chosen so that a "plus" indicates that the effect favored the intervention community in the health-promoting direction.

DISCUSSION

Community health promotion has great public health, epidemiological, and financial appeal. Even small shifts in risk factor distributions of the entire population in a healthful direction can convey health benefits as large or larger than expensive screening and clinical management of high-risk individuals (Kottke, Puska, Salonen, et al. 1985). If these reductions in risk factors can be produced by community activation, public education, or environmental action, cost-effectiveness ratios become very attractive. On the basis of this idea and the apparent early success of the Stanford Three-Community and North Karelia projects, the CHPGP supported local efforts to improve health-related behaviors with small grants and technical assistance.

Unlike the large community-based cardiovascular prevention and smoking cessation trials, where the interventions and evaluations were strongly influenced by research teams and were standardized across communities, the CHPGP attempted to see if local communities could design and implement effective programs (Tarlov, Kehrer, Hall, et al. 1987; Wagner, Koepsell, Anderman, et al. 1991). Intervention strategies were not standardized across communities, and programs varied widely in community characteristics, health targets, and intervention approaches (Wickizer, Wagner, Cheadle, et al. 1998). The heterogeneity of communities and programs precluded a multi-site evaluation model with a single overall result. Instead, we evaluated each program independently against its set of randomized, matched, or selected control communities. This limited statistical power.

Of the nine programs based in cities or counties, seven managed to put into place programs generally consistent with the Foundation's model and goals (Tarlov, Kehrer, Hall, et al. 1987; Wickizer, Wagner, Cheadle, et al. 1998). The two problematic programs served low-income populations and were based in unstable community agencies. In part because of these difficulties, we were unable to collect behavioral data in these communities.

In terms of the primary outcome of behavior change, the CHPGP was, like other recently reported community-based efforts (Luepker, Murray, Jacobs, et al. 1994; Mittelmark, Luepker Jacobs, et al. 1986; COMMIT Research Group 1995a,b; Carleton, Lasater, Assaf, et al. 1995), a largely negative trial. For six programs (A, B, C, E, G, and I), we were able to collect relevant attitudinal and behavioral data over time, and measured behavioral outcomes generally did not differ between intervention and control communities.

Two local programs, G and I, were associated with some positive changes in the targeted outcomes in their communities. Program G attempted

to reduce dietary fat from fried foods and high-fat dairy products by working with the grocery stores, clinics, and schools in a predominantly Mexican community. The evaluation findings showed increases in the community's perceptions that restaurants offered low-fat items ($p = .01$), and that supermarkets pointed out low-fat food items ($p = .08$). The data also show sizable increases in the proportion of shelf space in grocery stores devoted to low-fat milk (19 percent over the follow-up period) and in the self-reported consumption of low-fat milk (17 percent), but in the control communities as well. Other indicators of improved eating patterns, such as the consumption of fruits and vegetables, actually were worse when compared to control communities.

Program I tried to reduce the use of drugs and alcohol among Native American young people living on or near a poverty-stricken reservation. Our evaluation of this program was limited by the relatively small number of adolescents in the community, its non-random selection, and the lack of optimal comparison communities. With these caveats in mind, we found large and consistent self-reported reductions in the use of marijuana and alcohol by Native American adolescents in this community. The declines in marijuana use were significantly greater than those seen among white adolescents residing in the same area or among adolescents living in other rural areas that served as control communities. These declines in the prevalence of substance use may reflect social desirability in responses to the questionnaire, regression to the mean, or the energetic and visible set of activities put in place by the CHPGP program.

Methodologic limitations may well have limited our ability to find positive effects. For example, four years may not be sufficient follow-up to detect changes in population attitudes or behaviors. Further, in contrast to the NIH programs, the CHPGP evaluation relied exclusively on self-reported measures of behavior. A number of these, such as dietary patterns or substance use, are measured with considerable error and could be influenced by local publicity. The relatively low rate of response to the adult telephone survey may have also biased the findings, but response rates did not differ between intervention and control communities. Lack of statistical power is a potential explanation for some of our null findings. However, the differences in various outcomes between intervention and control communities for most communities were both positive and negative suggesting that we did not miss a small but important effect.

In three other local communities (D, F, H), we could not collect full behavioral data, but the process data and community activation surveys provided no evidence that they mounted programs that could affect behavioral

outcomes. As indicated earlier, the programs in communities F and H were unable to implement significant interventions until very late in the grant period. The program in community D included only a few of the many high schools in this large metropolitan area, and it is highly unlikely that this program could have generated a measurable effect on adolescent behavior in the large urban population of community D.

The goals of the two statewide programs were to encourage the development of community-based health promotion activities in local communities through small grants and technical assistance. As a consequence, the outcomes of the two statewide programs were difficult to evaluate. In both states, local assistance and grant programs were put in place, but the grants, which were small (<$5,000), generally supported community needs assessment and planning rather than intervention activities. We collected community activation data at the state level and in a few local communities, but restricted outcome data collection to one local grantee in state J. No consistent changes in activation or outcomes were noted in either state.

If, in fact, programs G and I were able to affect the targeted attitudes and behaviors in their communities, is there any evidence to suggest that it was a consequence of an activated community as the program model would suggest? The evidence presented here and in a related paper (Wickizer, Wagner, Cheadle, et al. 1998) provides no confirmatory evidence. Coalitions have become standard elements in community health activities despite a paucity of evidence about whether or not they are effective. All but two CHPGP programs (sites D and H) had active coalitions; coalition members devoted an average of six hours a month to program activities. Despite their efforts, our measures of community activation were unable to detect more favorable views of the community's efforts to promote health, or greater collaboration among community organizations and agencies. Our data suggest that greater local involvement and direction seemed to offer no measurable advantage in program effectiveness, but may well have been related to the fact that nearly two-thirds of the programs persisted beyond the grant (Wickizer, Wagner, Cheadle, et al. 1998).

Debate continues on whether the overall results of well-evaluated community prevention efforts warrant further dissemination of this model. The persistent failure to find unequivocally positive evaluation results for community-based preventive interventions has occasioned serious reappraisals not only of current intervention and evaluation approaches, but of the underlying logic as well. The methods of evaluation have been thoughtfully reviewed recently (McKinlay 1996; Murray 1995). The goal of community-

based interventions is to produce small changes in behavior among the majority of community residents. This can occur only if sufficiently powerful interventions reach a large proportion of the target population. With few exceptions, the less successful CHPGP programs implemented interventions that were too weak to have much effect on individual behavior, too limited to reach broad segments of the target population, or both. The creation or selection of untested or ineffective intervention components probably accounted for the lack of effectiveness of some CHPGP programs. Ineffective interventions have been identified as a major reason for the repeated failure of community-based substance abuse prevention programs (Dusenbury and Falco 1995). Many of the proven interventions used in the CHPGP—for example, refusal-skills training for children or classes on parenting—have at best weakly positive effects even among those known to be active participants (Gorman 1995). To be successful, programs must be guided by more specific treatment theories that will explain how interventions will reach the bulk of the target population in sufficient "dosage" to be detectable among randomly sampled residents of a community, since the "study population" will include many individuals who have no exposure to program elements: in-migrants, for instance (Wickizer, Wagner, Cheadle, et al. 1998). This is critical because local program messages blend with the myriad health-related messages and social trends that affect both intervention and control communities. As a result, time trends in health behaviors are marked, and thus it becomes difficult to produce small additional program effects in the setting of these trends.

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