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Population Health

Kaiser Permanente's Community Health Initiative in Northern California: Evaluation Findings and Lessons Learned

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Abstract

Purpose. *To describe the evaluation findings and lessons learned from the Kaiser Permanente Healthy Eating Active Living–Community Health Initiative.*

Design. *Mixed methods design: qualitative case studies combined with pre/post population-level food and physical activity measures, using matched comparison schools for youth surveys.*

Setting. *Three low-income communities in Northern California (combined population 129,260).*

Subjects. *All residents of the three communities.*

Intervention. *Five-year grants of $1.5 million awarded to each community to support the implementation of community- and organizational-level policy and environmental changes. Sectors targeted included schools, health care settings, worksites, and neighborhoods.*

Measures. *Reach (percentage exposed) and strength (effect size) of the interventions combined with population-level measures of physical activity (e.g., minutes of physical activity) and nutrition (e.g., fruit and vegetable servings).*

Analysis. *Pre/post analysis of population level measures, comparing changes in intervention to comparison for youth survey measures.*

Results. *The population-level results were inconclusive overall, but showed positive and significant findings for four out of nine comparisons where "high-dose" (i.e., greater than 20% of the population reached and high strength) strategies were implemented, primarily physical activity interventions targeting school-age youth.*

Conclusion. *The positive and significant changes for the high-dose strategies suggest that if environmental interventions are of sufficient reach and strength they may be able to favorably impact obesity-related behaviors. (Am J Health Promot 2012;27[2]:e59–e68.)*

Key Words: Community Health Initiatives, Obesity Prevention, Environmental Change, Prevention Research. Manuscript format: research; Research purpose: intervention testing/program evaluation; Study design: quasi-experimental; Outcome measure: behavioral; Setting: local community; Health focus: fitness/physical activity, nutrition, weight control; Strategy: policy, built environment; Target population age: youth, adults; Target population circumstances: geographic location

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PURPOSE

There is an increasing focus among public health practitioners on using policy and environmental change to promote long-lasting improvements in population health.[1–4] Policy and environmental approaches are particularly well suited to obesity prevention efforts. Examples include promoting physical activity by making changes in the built environment and increasing the availability of healthy food choices in community settings.[5–10]

Implementing policy and environmental change is challenging and requires a sustained effort from a broad range of community stakeholders. To promote such a sustainable, inclusive approach, a number of obesity prevention efforts have adopted the approach of ''comprehensive community initiatives.'' Comprehensive community initiatives take a much broader view of what constitutes community health (e.g., the focus on social determinants of health in the ''Healthy Cities and Communities'' movement[11–13]) and emphasize the importance of involvement from residents and grassroots community-based organizations. Examples of comprehensive community initiatives in the area of obesity prevention include the California Endowment's Healthy Eating Active Communities initiative,[14,15] the W.K. Kellogg Foundation's Food and Fitness Initiative,[16] the Robert Wood Johnson Foundation's Healthy Kids/Healthy Communities initiative,[17] Shape Up Somerville (Massachusetts),[18] and the Centers for Disease Control and Prevention's Communities Putting Prevention to Work.[19]

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Kaiser Permanente (KP), a large, nonprofit, integrated health care delivery system based in Oakland, California, created the Community Health Initiatives (CHIs) in 2003 to promote obesity prevention policy and environmental change in communities served by KP. CHI is a comprehensive community-based approach designed to promote population-level improvements in intermediate outcomes (e.g., levels of physical activity and proportions of the population eating a healthy diet) as well as longer-term improvements in related health outcomes (e.g., chronic illness outcomes). This article describes the evaluation findings and lessons learned from the first phase of implementing the CHI approach in KP's northern California region: the Healthy Eating Active Living–Community Health Initiative (HEAL-CHI).

METHODS

Design

The HEAL-CHI evaluation used a logic model approach[20] to assessing impact that combined indicators of intermediate outcomes (e.g., environmental and policy changes implemented in communities) with more conventional pre/post tracking of population-level measures of physical activity and nutrition (e.g., surveys of youth and adults) to measure population-level improvement. The HEAL-CHI evaluation was led by the Center for Community Health and Evaluation at Group Health Research Institute; other evaluation partners included the Atkins Center for Weight and Health at University of California, Berkeley, and the Kansas University Work Group for Community Health and Development. The institutional review board (IRB) at Group Health Research Institute approved the overall project and methods; the IRB at University of California, Berkeley, separately approved the youth survey.

Sample

The KP Northern California Community Benefit Programs Department selected three community collaboratives for 5 years of funding ($1.5 million total per community), based on the strength of their proposed activities and track record of success in other initiatives. Three Northern California communities participated in HEAL-CHI: Modesto (population 38,400 within the neighborhood target area, 54% Latino), Richmond (52,900, 45% Latino, 29% African-American), and Santa Rosa (37,960, 41% Latino).

Measures

Three principal data sources were used to assess HEAL-CHI impact on improving population-level nutrition and physical activity behaviors: (1) Documentation of Community Change (DOCC) database to track the implementation, reach, and impact of Community Action Plan (CAP) strategies; (2) population-level measures, including pre/post surveys of youth and select parts of Fitnessgram testing among youth (fifth, seventh and ninth grade aerobic capacity, height, and weight measures); and (3) key informant interviews and Photovoice to gather the community perspective on the most important impacts in their communities.

DOCC. We tracked intervention strategies using the DOCC database that included implementation status and number of people reached by each strategy (more details on the DOCC can be found elsewhere).[21] Strategies were defined operationally through review and analysis of the CAPs. The DOCC was updated each year through progress reporting, site visits, and conversations with collaborative staff and technical assistance providers. In addition to the dose ratings described below, we also rated the sustainability of each strategy, if implemented successfully. For example, strategies more likely to be sustained included built environment changes, policy changes, and programs that had secured an institutional home and ongoing funding. If a strategy was relatively certain to be sustained (e.g., built environment changes), it was rated ''sustainable.'' If sustainability was likely, but conditional on some level of continued resources or effort (e.g., continuing to offer new healthier entrees in a school cafeteria), it was rated as ''potentially sustainable.''

To provide an estimate of the impact of the CAP strategies on behavior change, the DOCC also included an assessment by the evaluators of the reach (number of people exposed) and strength (impact on each person exposed) of each strategy, which can be combined into an estimate of ''population dose.'' Population dose is defined operationally as the product of penetration (reach divided by the size of the target population) and effect size (relative change in behavior for each person exposed, e.g., 10% increase in minutes walked per day among residents living near a newly installed walking trail). For example, if 10% of the community target population lives near a new walking trail and the average effect size is 10% for each person exposed (living near the trail), the population dose is $10\% \times 10\% = 1\%$. Essentially, population dose is the effect size of the intervention, if the effect was spread across all of the residents of the target community. This approach to quantifying impact is drawn from the RE-AIM[22] approach of multiplying ''reach'' and ''effectiveness.''

Because quantitative effect sizes for policy and environmental change interventions are generally unavailable in the literature, we used a three-level rating system (high/medium/low) to assess the strength of each intervention strategy. In some cases the ratings were based on strategy-level evaluations that measured behavioral impact on those exposed; for example, pre/post surveys of employees were used to assess the strength of some worksite interventions. However, in most cases the ratings were based on a subjective assessment of the intensity of the intervention (e.g., magnitude of changes made to the built environment to promote walkability), frequency of exposure (e.g., one-time walk to school event vs. a daily Walking School Bus), and the degree to which the environmental changes restricted choices to healthier ones (e.g., removing all unhealthy snacks from a closed-campus school vs. adding a few healthy snacks but leaving the unhealthy ones in place). When there was limited information to confirm a strong intervention, we conservatively assigned the strategy a ''medium'' rating. Multiple raters reviewed and rated each strategy and any differences between raters

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Table 1
CHI Interventions—Examples From Northern California HEAL-CHI*

Category†	Policy Aim‡	Intervention Examples
Programs (25%; n = 19)		• Promote physical activities in after-school programs • Implement BMI measurement as a vital sign into well visits at community clinics and offer routine obesity counseling and referral • Promote parents' and students' community awareness regarding healthy eating and active living at the targeted schools
Policies: organizational change (34%; n = 26)	Nutrition environment (n = 8)	• Change cafeteria policies in schools and worksites to increase the number of healthy entrees
	Physical activity environment (n = 2)	• Changes in worksite physical activity environments, including point of decision prompts in stairwells
	Programs (n = 16)	• Implement California Standards–based physical activity curriculum during school hours in local elementary schools
Environmental change (16%; n = 12)		• Install a lighted walking trail to provide access to safe physical activity • Participate in Safe Routes to School to increase street safety for walking and biking to school • Increase purchase or distribution points for fresh fruits and vegetables in the community
Public policy (7%; n = 5)	Physical activity environment (n = 5)	• Work with city and county code enforcement to enforce existing laws and ordinances that govern the sale of alcohol to decrease the public nuisance associated with liquor stores • Impact urban planning via changes to the city general plans and explore other smart growth opportunities
Community capacity building (18%; n = 14)		• Mobilize residents to create an ongoing grassroots effort to advocate for healthy eating and physical activity options in their neighborhoods • Build worksite sector leadership and infrastructure • Recruit the faith-based community into the HEAL-CHI collaborative

* CHI indicates Community Health Initiatives; HEAL, Healthy Eating Active Living; and BMI, body mass index.
† The total number of strategies across all 3 communities was 76.
‡ All policy strategies (either organizational or public policies) were tracked with a secondary code to indicate the aim of the policy; for example, to put in place a program or make a change to an organizational practice or community environment.

were reconciled through discussion of how the criteria were applied and, in some cases, further investigation into the way the strategy was implemented through contact with the community coordinators.

Population-Level Measures. Population-level change was tracked for youth using a school-based survey on food and physical activity behaviors and the height/weight and aerobic capacity measures from the Fitnessgram test administered in California schools. Two additional data sources were used for adults that are not reported here: Interactive Voice Response (IVR) phone surveys and clinical data on height and weight from KP members residing in the target communities. The IVR response rates were too low to provide credible information, and the KP member data are being used for more long-term tracking, beyond the initial 5 years of HEAL-CHI funding.

CHI outcomes among seventh- and ninth-grade youth were measured using a self-administered, proctored survey conducted in middle and high schools. Grades 7 and 9 were selected because older students are better able to complete questionnaires about eating and physical activity behaviors than younger children. Survey questions asked about youth attitudes and behavior regarding nutrition and physical activity in schools and in their communities. The majority of school survey questions were drawn from existing, validated instruments, supplemented by additional questions asking about the school and neighborhood environment that were modeled closely after existing instruments. The school surveys were supplemented with selected Fitnessgram measurements. Fitnessgram is a statewide program conducted among fifth, seventh, and ninth graders in all elementary, middle, and high schools. Fitnessgram measures six physical fitness areas that have been identified as important to overall health and function: aerobic capacity; body composition; abdominal, trunk, and upper body strength; and flexibility. Only the aerobic capacity results (One-Mile Run test) are reported here. Demographically matched comparison schools were selected for each of the schools in the HEAL-CHI communities.

Photovoice and Key Informant Interviews. Photovoice is a community-based, participatory approach to documentary photography that was developed by Wang and Burris.[23] Community residents in each of the HEAL-CHI communities attended a training on the method and were given cameras to take pictures that represented barriers to healthy eating and safe physical activity in their communities. Participants attended a second training to discuss their photos and write captions to accompany their self-selected photographs. The captioned photographs were successfully used at baseline to promote advocacy around policy and environmental change (e.g., showing the photographs at city council meetings to promote safer routes to schools

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Table 2
Reach and Strength of HEAL-CHI Interventions*

Health Target	Community A	Community B	Community C
School-age youth interventions			
PA behaviors			
School PE—active minutes†	Implement standards-based PE program (48%, low)	**Implement standards-based PE program (100%, high)**	Implement standards-based PE program (100%, medium)
After-school physical activity participation	**SPARK after-school program, walking program, other activities (25%, high)**	Increase opportunities for PA in after-school programs (19%, low)	Increase opportunities for PA in after-school programs (19%, medium)
Students walking/biking to school	SRTS program—Walking School Bus (1%, high)	SRTS accessibility plan (1%, medium)	SRTS infrastructure enhancements (50%, low)
Minutes of moderate or vigorous PA†	**PE standards† (48%, low)** **After-school programs (25%, high)** **SRTS (1%, high)** **Community PA media campaign (20%, low)** **School-based awareness activities (29%, low)**	**PE standards (100%, high)** **After-school programs (19%, low)** **SRTS (1%, medium)** **School programs, plus: school-based awareness activities (4%, medium)**	**PE standards (100%, medium)** **After-school programs (19%, medium)** **SRTS (50%, low)** **PE and after-school programs, plus: community infrastructure enhancements (7%, low)**
Food behaviors			
Candy/sweets as reward	Alternative classroom rewards program (100%, medium)	Alternative classroom rewards program (100%, medium)	Alternative classroom rewards program (100%, medium)
Healthfulness of school breakfast/lunch	**Implement nutrition guidelines in schools (100%, high)** **Expand universal breakfast program in schools (42%, medium)**	**Implement nutrition guidelines in schools (100%, medium)** **Implement universal breakfast program in schools (28%, medium)**	Improve healthfulness of food options, including removing sweetened milk and adding more whole food options (100%, medium)
Salad consumption	Install salad bars (100%, medium)		Install salad bars (100%, medium)
Fruit and vegetable consumption	Nutrition guidelines (100%, medium)	Nutrition guidelines (100%, medium)	**Healthy food options (100%, medium)** **Salad bars (100%, medium)** **In addition:** **Garden education (11%, low)** **Harvest of the Month program (95%, low)**
Obesity/overweight			
BMI	Health clinic BMI as a vital sign, referrals to programs (20%, low)		BMI screening, referrals to programs (4%, low)‡
Adult/family interventions			
PA Behaviors			
Min/wk of physical activity—meeting recommended standards§	Worksite wellness programs (10%, medium)‖	Park revitalization (19%, low) Establish and promote walking and biking paths (19%, medium) Add HEAL elements to city general development plans (95%, medium)¶ Worksite wellness programs (5%, low)	Infrastructure enhancements (parks, trails, open space) (7%, low) Worksite wellness programs (6%, low) Exercise programs developed by resident leaders (2%, medium)
Food behaviors			
Fruit and vegetable consumption	Healthy produce basket in corner stores (11%, low) Farmers market (2%, medium) Worksite wellness programs (10%, medium)	Healthy retail programs (13%, medium) Worksite wellness programs (5%, low)	Healthy retail program (50%, low) Community gardens (1%, medium) Worksite wellness programs (6%, low) Smart Meal restaurant program (8%, low)

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Table 2, Continued

Health Target	Community A	Community B	Community C
Program awarenes/participation			
Awareness of community HEAL efforts	Initiative social marketing (44%, low) Campaign to increase awareness of physical activity opportunities (20%, low)	Community awareness campaign (19%, low)	Media advocacy campaign (11%, low) Resident leader training and advocacy (12%, low)
Obesity/overweight			
BMI			BMI screening, referrals to programs (4%, low)‡

* Data in parentheses are reach percentage and strength rating. Reach percentage is number exposed to the intervention divided by total school enrollment. Strength is rating of impact on each person reached: high, medium, or low (see text for definitions). Cells are in bold type if reach and strength for strategies listed in that cell are by themselves or cumulatively add up (e.g., various school-based interventions combined) to "high dose"—approximately greater than 20% reach and cumulative high strength. Strategies with less than 1% reach are not listed in the table. HEAL-CHI indicates Healthy Eating Active Living–Community Health Initiative; PA, physical activity; PE, physical education; SPARK, physical education programs for schools developed by School Specialty Physical Education & Wellness; SRTS, Safe Routes to School; and BMI, body mass index.
† Interventions associated with more than one Health Target.
‡ Both adults and children were included in the BMI screening, so the denominator was all clinic patients, children and adults.
§ Recommended level is moderate exercise 5 times/wk, 30 min/occasion OR vigorous exercise 3 d/wk, 20 min/occasion.
‖ Reach of worksite wellness programs includes people who may not live in the neighborhood.
¶ Health element to the general plan added, but no built environmental changes have resulted to date.

or to Park and Recreation to promote improved playgrounds).[24] At follow-up the Photovoice process was repeated, this time asking residents to take photos of the most significant HEAL-related changes in their communities as a result of the initiative.

Key informant interviews were conducted with collaborative members in both 2007 and 2010 to gather information about collaborative functioning and to ask community members about the key accomplishments and challenges of implementing HEAL-CHI.

Intervention

HEAL-CHI is part of a national KP initiative—CHI—that provided the model intervention approach: a place-based focus[25]; an emphasis on change at multiple levels, particularly environmental[26] and policy change; a multisectoral collaboration[27] that involves sectors such as health care, neighborhood, schools, and worksites; and community engagement and community ownership.[28] CHI is currently being implemented in over 40 communities in five KP regions around the country.

The HEAL-CHI funding was used to hire a community coordinator and to provide support for community partner activities. During the first year of funding, the HEAL-CHI collaboratives convened a community-wide planning process involving a range of community-based organizations, institutions, and residents. CAPs were written that included activities in each of four sectors—schools, health care, worksites, and the neighborhood—with at least one intervention strategy in each drawn from a menu of evidence-based policy and environmental change approaches provided by KP and based on recent guidance in this area.[29] Each collaborative selected or modified interventions to be culturally appropriate to their communities. The remaining 4 years of the initiative (2007–2010) were used to implement the CAPs.

Table 1 provides examples of strategies implemented by the three HEAL-CHI communities. Examples of programmatic activities included in the final CAPs by 2010 (CAPs were adjusted each year) included setting up new programs and services, promoting existing programs, offering health education, and carrying out social marketing efforts. Organizational change activities included efforts in schools to change the nutrition environment in cafeterias and to implement standards-based physical education programs. Environmental change strategies included both the built environment (e.g., constructing a walking trail), and increasing the availability of fresh produce. Public policy strategies included working with the city planning department to bring health considerations (e.g., walkability) to the general plan revisions. Capacity building activities include grassroots mobilization and working to build or strengthen ties among community-based organizations.

Analysis

The DOCC information on strategy distribution was summarized descriptively using frequencies and cross-tabulations. The population dose ratings (i.e., reach and strength) were compiled and grouped by associated outcome measures (e.g., minutes of physical activity) and population segment (e.g., school-age youth, adults/families). For example, strategies attempting to increase minutes of physical activity among school-age youth in a community might include an enhanced PE curriculum, exercise components in after-school programs, and Safe Routes to School programs to encourage walking and biking to school. These combined strategies were then assessed and an estimate made of the collective impact of the strategies on the indicated behavior, in particular whether the combined impact was likely to be high

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dose—defined as greater than 20% reach (the 20% threshold was somewhat arbitrary; using different reach thresholds did not alter the ultimate ratings reflected in Table 2 in the Results section). For example, if all three of the school-age strategies were greater than 20% reach and each was medium strength, we would estimate that the collective strength was high and rated the impact of the three strategies combined as having high population dose.

The youth survey and Fitnessgram variables were dichotomized (e.g., four-point Likert scales ranging from strongly disagree to strongly agree were converted to agree/disagree) and pre-intervention and postintervention frequencies computed for each outcome measure by intervention and comparison group. Logistic regressions with terms for intervention status, time, and intervention by time were used to compute the statistical significance comparing changes in intervention communities to the changes in the comparisons. The logistic regression coefficient standard errors were adjusted for clustering by school using Stata (Version 10.1)[30] survey procedures.

Two additional analyses were conducted with the youth survey data. First, because of the large number of variables on the survey and to minimize the problem of multiple comparisons, sign tests were used to provide a summary estimate of intervention/comparison differences.[31] For each variable, the change score was computed for intervention and comparison communities. The change was coded as favoring the intervention if the change score in the positive (health-promoting) direction exceeded the change in the controls. A sign test was used to assess whether the number of changes favoring the intervention was greater than would be expected because of chance alone. The sign tests were conducted separately by grade (seventh and ninth grade) and physical activity (n = 31 variables)/nutrition (n = 28 variables).

The second additional youth survey analysis focused on outcome measures specific to the high-dose strategies that were implemented. Results for the community and outcome measures were computed following the logistic regression procedure described above.

RESULTS

Strategy Implementation and Sustainability

The HEAL-CHI CAPs implemented by the end of the initiative contained 76 strategies across the three communities (range 25–26 per community). Table 1 shows examples of HEAL-CHI strategies organized generally by the levels of the ecological model for health promotion,[32] where the most immediate, proximal influences on individual behavior (e.g., programs, organizational-level policies) are listed first and the more distal (e.g., public policy, community environment) are listed in the table below them. Community capacity building strategies can affect change at all levels; for example, building capacity to implement and sustain programs or to create policy and environmental change. Out of the 76 HEAL-CHI strategies, 19 (25%) were programmatic and 26 (34%) involved organizational policy change. Fourteen strategies (18%) were focused on building community capacity, which can affect change in all of the other levels.

Of the 62 strategies that were not capacity building, 49 (79%) had been implemented successfully by the end of the initiative in December 2010. Of the 49 implemented strategies, 38 (78%) were judged to be potentially sustainable beyond the period of grant funding—either because they were policy or environmental changes that were durable by their nature, or because programs had found an institutional home and secure funding. Of the 38 implemented and sustained strategies, 30 (79%) were policy or environmental change strategies, including 22 that implemented organizational policy changes in schools, worksites, health care settings, food stores, or restaurants.

Population Dose Estimates

Table 2 summarizes the population dose (reach and strength) of the implemented strategies for school-age youth and adults/families, grouped by community and the outcome measure targeted by the strategies. Note that some strategies impact more than one outcome measure; for example, the after-school exercise program in Community A can impact both the narrower outcome of students exercising after school and the broader outcome of overall minutes of physical activity. Note also that the same generic strategies can have different strength ratings, depending on how they were implemented. For example, in Community A the PE curriculum changes (row 1, Table 2) were implemented through teachers shadowing an experienced PE teacher once a month and then implementing the program on their own, whereas in Community B there was more widespread, systematic implementation of the new curriculum.

The highest dose interventions were in school-age youth physical activity, where all three communities had combinations of interventions that were collectively rated as high reach and high strength for increasing minutes of physical activity. Only Community C was rated as having a high-dose collection of food behavior strategies that could be expected to increase the consumption of fruits and vegetables. And, although there were a number of significant high-reach environmental interventions in the communities—including infrastructure changes and healthy food retail interventions—none were strong enough to be rated high dose.

Population-Level Measures

We report the population-level results both overall and focusing on the high-dose strategies, where we expected to see significant positive changes. The overall results for the youth survey measures were inconclusive: the sign tests (not shown in tables) showed no difference in the number of outcome measures where changes favored the intervention communities. However, the results focusing on high-dose strategies were more positive. Table 3 shows the results for the youth survey outcome measures where there were high-dose strategies implemented in which we expected to see changes in outcome measures. Results are shown for seventh graders only because most of the intervention activities were focused in middle schools. Of the nine comparisons, four were statistically significant and favoring the intervention, all in physical activity outcomes.

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Table 3
HEAL-CHI Seventh-Grade Youth Survey Results—Testing High-Dose Interventions†

Variable	Intervention		Comparison	
	2007	2010	2007	2010
Community A				
No. of respondents	361	299	902	871
Exercised in after-school program, %	33	46	42	34*
Spent 20+ min doing vigorous activity yesterday, %	61	67	56	51*
Spent 20+ min doing any activity yesterday, %	72	77	67	60*
Community B				
No. of respondents	237	409	902	871
Exercised at least 20 min in PE class, %	43	49	61	58*
Spent 20+ min doing vigorous activity yesterday, %	48	44	56	51
Spent 20+ min doing any activity yesterday, %	58	55	67	60
Community C				
No. of respondents	92	140	902	871
Spent 20+ min doing vigorous activity yesterday, %	63	59	56	51
Spent 20+ min doing any activity yesterday, %	72	66	67	60
Servings of fruits and vegetables/d	4.0	4.1	3.9	3.7

† "High-dose" interventions collectively reach at least 20% of the population and are rated as high strength; see text for more details on dose ratings. CHI indicates Community Health Initiatives; PE, physical education.
* $p < 0.05$ for test comparing changes in intervention communities to changes in comparisons, based on logistic regressions with terms for intervention status, time, and intervention by time, adjusted for clustering by school.

These positive youth survey results for physical activity were corroborated by the Fitnessgram results for fifth graders (Table 4), where high-dose interventions also took place. Two of the communities where there were high-dose interventions in elementary school showed favorable increases in the aerobic capacity measures relative to the controls. However, the middle school results in two communities were significant in the opposite direction, with no change in the intervention schools and an improvement in the controls.

Table 4
CHI Fitnessgram Results—Aerobic Capacity Measures†

	Intervention, % (n)		Comparison, % (n)	
	2007	2010	2007	2010
Community A				
Fifth grade	24 (149)	64 (85)	43 (175)	22* (153)
Seventh grade	87 (392)	87 (298)	70 (547)	88* (512)
Ninth grade	49 (762)	57 (671)	33 (514)	—‡ (554)
Community B				
Fifth grade	50 (114)	19 (99)	46 (73)	22 (90)
Seventh grade	—‡ (254)	—‡ (386)	53 (411)	54 (436)
Ninth grade	384 (404)	49 (384)	57 (498)	75 (504)
Community C				
Fifth grade	54 (73)	70 (86)	43 (175)	22* (153)
Seventh grade	64 (345)	60 (363)	70 (547)	88* (512)
Ninth grade	74 (317)	68 (340)	33 (514)	—‡ (554)

† In the "healthy fitness zone" for the One-Mile Run test.
‡ Comparison data not available in 2010.
* $p < 0.05$ for test comparing changes in intervention communities to changes in comparisons, based on logistic regressions with terms for intervention status, time, and intervention by time, adjusted for clustering by school.

Community Perspective: Photovoice and Key Informant Interviews

In each community, a number of accomplishments were identified as being important to the community members involved in HEAL-CHI—either mentioned repeatedly in the key informant interviews in each community or highlighted in the Photovoice process. The following are accomplishments that were mentioned by at least three informants in each community:

Community A:

- Installed a walking trail/path
- A new farmer's market and the growing garden that provided produce to the market
- School changes: after-school programming, after-school cooking clubs, and encouraged schools to offer universal breakfast
- Got fresh fruits in the neighborhood stores

Community B:

- The opportunity to have input into the city general plan policy initiatives that attempted to add health elements to the plan
- Increased demand for and access to healthy food for families and individuals needing assistance
- Youth engagement in advocacy—conducted park survey in 51 parks and presented the results to the city council at a time when it made decisions about parks and the master plan

Community C:

- Healthier schools: new school menus, salad bars and food policies were added, and schools changed practices for food at events
- Institutionalized body mass index (BMI) counseling and screening in all community clinics
- Classes at clinics that focus on family HEAL choices

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Figure
Photovoice Example: Community Perspective on HEAL-CHI Impact

Because of the efforts of a Safe Routes to School Community Partnership, the city was awarded a $600,000 grant to install a sidewalk, crosswalk, and crossing signs on this street next to an elementary school. The improvements will make it safer for students and their families to walk and hike to school. More funding is needed to help cities and the county to continue making infrastructure improvements near schools. (Community Photovoice Participant.)

The Figure shows example photographs and captions from one community describing a change that the residents participating in Photovoice viewed as particularly important: new sidewalks and other pedestrian-friendly improvements near schools to encourage walking to schools. We also asked Photovoice participants to list the five most important HEAL-related community changes they had seen in their communities. Across all three communities, these changes were:

- Increased access to fresh, healthy food in neighborhoods
- Successful policy advocacy that resulted in health elements in general plans
- Increased (safe) walkability
- Improved school nutrition, including implementing California nutrition standards and offering universal breakfast.
- Leadership development
- Healthy messaging

DISCUSSION

This paper described the evaluation findings from KP's HEAL-CHI Initiative, a comprehensive community initiative designed to promote policy and environmental changes in three communities in northern California. The initiative was successful in implementing policy and environmental strategies, the majority of which are potentially sustainable. The population-level results were inconclusive overall, but showed positive and significant findings for four of the nine youth survey comparisons where high-dose (i.e., greater than 20% of the population reached and high strength) strategies were implemented, primarily physical activity interventions targeting elementary and middle school-age youth. These high-dose interventions included the district-wide implementation of an evidence-based PE curriculum in one community, and revising an after-school program to include 20 minutes of regular exercise in another community.

Despite the rapidly growing interest in community-level approaches to obesity prevention, there are relatively few published studies of community initiatives similar to HEAL-CHI, and all of the studies we were able to locate focused on children, rather than adults or families. The studies tended to be intensive interventions with an emphasis on school-based programs, supported by a variety of community environmental, program, and policy changes. The best known of these is Shape Up Somerville, a comprehensive community-level intervention involving children, parents, teachers, school food service providers, city departments, policy makers, health care providers, before- and after-school programs, restaurants, and the media.[18] The Shape Up Somerville intervention resulted in a modest, but significant, decline in BMI z-scores in children in grades 1 through 3. Two similar studies with a school focus combined with community support produced very similar reductions in BMI among children: Be Active, Be Well[33] and the APPLE project.[34] A 12-year study in two small French towns also showed BMI reductions among children that were associated with a sustained community- and school-based intervention.[35] Note that because most of the studies focused on young children, BMI was typically the only outcome measure reported, because the children were too young to respond to behavioral surveys. These limited results suggest that more intensive interventions (''high-dose'' in our terminology) are needed to move population-level outcomes.

Lessons Learned

A number of lessons emerged from the process of implementing the HEAL-CHI intervention and evaluation that may be useful for other, similar initiatives. One of the evaluation goals was to provide formative feedback, and many of these lessons are being incorporated in phase two of the initiative started in 2011 with seven northern California communities.

Select Smaller Communities and Fewer, More Focused Strategies. It may have been overly ambitious to have

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population-level change as a goal with communities of approximately 40,000 people, attempting to implement 20+ significant environmental change strategies across multiple sectors within a 4-year implementation period. The project staff and collaborative members may have been spread too thin to implement time-intensive strategies.

Implement Interventions of Sufficient Dose. The HEAL-CHI population-level results related to the higher-dose youth physical activity interventions suggest that, to have a realistic chance of making a change at the population level, interventions need to be of sufficient reach and strength. Ongoing feedback on how to deliver this and accountability for doing so should be communicated throughout the planning and implementation phases, with targeted, timely assistance reinforcing these messages and providing support to communities to achieve this. In addition, focusing on specific subpopulations, such as school-age youth, may be another way to one way of achieving high-dose strategies with limited resources.

Develop More Sensitive Measures of Impact. The principal longer-term outcome measures in our evaluation design were standard behavioral and health outcomes (e.g., servings of fruits and vegetables, minutes of physical activity) measured using population-level surveys or clinical data. These outcomes are likely too distal to be achieved within a 4-year initiative. Options for more proximal outcomes being explored for phase two of HEAL-CHI include strategy-level evaluations that look at behavioral impact on those directly exposed (e.g., measuring increased walking among users of a new walking trail or increase in consumption of fruits and vegetables by shoppers at a corner store where fresh produce has been added). These strategy-level evaluations will also assist in improving the accuracy of the population dose ratings and provide communities with additional process feedback for program improvement. Another method of capturing more proximal outcomes is to add questions to the population level surveys that ask about changes in attitudes and psychosocial domains that may be predictive of nutrition and physical activity behavior change.

Limitations

The HEAL-CHI study was designed as an evaluation. The evaluation objectives were to (1) document intermediate and long-term outcomes at both the strategy and community level, including reach, strength, dose, sustainability, and impact; (2) provide formative feedback for program improvement; and (3) disseminate results to key audiences. Because this was not designed as a research study, our ability to collect comprehensive, high-quality data in controlled environments was limited. To track implementation, resource limitations caused us to rely largely on progress reporting from the community collaboratives and other institutions involved (e.g., schools, worksites). These self-reports may have been biased in favor of making changes appear to be more comprehensive and sustainable than was true in practice. Where possible, we supplemented progress reporting through direct observation and environmental assessments. Finally, our ratings of the strength component of population dose were necessarily subjective given the lack of information in the scientific literature about effect sizes for HEAL-CHI environmental and policy interventions. We used multiple independent raters to attempt to standardize the ratings as much as possible and did sensitivity analysis to explore the impact of potential misclassification on the final results.

Despite these limitations, the HEAL-CHI evaluation results show that HEAL-CHI was generally successful in achieving its goals. The initiative led to the implementation of policy and environmental strategies, the majority of which are potentially sustainable. The population-level results were inconclusive overall, but showed positive and significant changes in several instances where high-dose strategies were implemented, primarily physical activity interventions targeting school-age youth. And significant community changes were reported by residents through interviews and Photovoice that they believed were positive steps that could lead to long-term improvements in health. Lessons learned from the initiative—smaller communities, more focused strategies, more sensitive population-level measures—are now being incorporated in phase two of HEAL-CHI.

SO WHAT? Implications for Health Promotion Practitioners and Researchers

What is already known on this topic?

Despite the rapidly growing interest in community-level approaches to obesity prevention, there are relatively few published studies of population-level results from community initiatives similar to HEAL-CHI. The few studies published have largely been intensive interventions with an emphasis on school-based programs, supported by a variety of community environmental, program, and policy changes.

What does this article add?

The population-level results showed some support for the concept of ''population dose,'' i.e., we found positive and significant changes in several instances where a high proportion of residents were exposed to interventions of sufficient strength/intensity.

What are the implications for health promotion practice or research?

To have a realistic chance of making a change at the population level, community-based interventions need to be of sufficient reach and strength.

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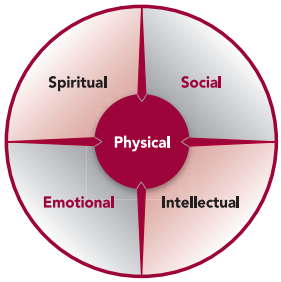
(O'Donnell, *American Journal of Health Promotion,* 2009, 24,1,iv)



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