The California Children's 5 a Day-Power Play! Campaign

Evaluation Study of Activities in the School Channel

Key Findings

March 1996

Nutrition and Cancer Prevention Program
California Department of Health Services
601 North 7th Street, MS-65
P.O. Box 942732
Sacramento, CA 94234-7320
(916) 323-0594

Nutrition Education and Training Program
California Department of Education
560 J Street, Room 270
Sacramento, CA 95814
(916) 323-2468

California Public Health Foundation
2001 Addison Street, Suite 200
Berkeley, CA 94704-1103

The California Department of Health Services is the health authority licensed by the National Cancer Institute to administer the *National 5 A Day Program* in California.

The *California Children's 5 a Day- Power Play! Campaign* is a special state initiative for children aged 9 through 11 years of age and their parents. It is directed by the California Department of Health Services and co-sponsored by the California Department of Education and the American Cancer Society, California Division, through a pubic/private partnership with the fruit and vegetable industry and other organizations concerned with improving the nutrition of children.

The *California Children's 5 a Day- Power Play! Campaign* is designed to complement the *National 5 A Day Program*, a nationwide initiative to promote fruit and vegetable consumption and improve public health. The *National 5 A Day Program* is a public/private partnership of the National Cancer Institute, the Produce for Better Health Foundation representing over 1,000 businesses in the nation's fruit and vegetable industry, and state health departments across the United States.

This research was conducted by the California Department of Health Services through the California Public Health Foundation, in partnership with the California Department of Education. A total of $168,000 was provided by the National Cancer Institute through Grant Number H75/CCH911397-01 from the Centers for Disease Control and Prevention.

The *California Children's 5 a Day- Power Play! Campaign* receives its principal funding from the Prevention and Preventive Health Services Block Grant of the Centers for Disease Control and Prevention.

THE CALIFORNIA CHILDREN'S 5 A DAY-POWER PLAY! CAMPAIGN: EVALUATION STUDY OF ACTIVITIES IN THE SCHOOL CHANNEL

KEY FINDINGS

CONTENTS

Introduction

Why Eating Fruits and Vegetables Is Important

What Is Being Done to Increase Children's Consumption

Overview of the Evaluation Study 3

Study Purpose

Description of Intervention Activities 5

Key Findings 6

Summary 9

Acknowledgements and Appreciation 11

Appendix: Charts and Graphs 12

THE CALIFORNIA CHILDREN'S 5 A DAY- POWER PLAY! CAMPAIGN EVALUATION STUDY OF ACTIVITIES IN THE SCHOOL CHANNEL KEY FINDINGS

INTRODUCTION

Why Eating Fruits and Vegetables Is Important

Increasing the consumption of fruits and vegetables to at least 5 daily servings is a national public health goal for both adults and children. Adults who eat 5 servings or more of fruits and vegetables experience about half the risk of most major cancers as adults who eat two servings or fewer. Higher fruit and vegetable consumption recently has been shown to be protective for heart disease and stroke. Adults who eat more fruits and vegetables eat diets lower in fat and are less overweight than persons who eat few fruits and vegetables. Adults who eat more fruits and vegetables report have done so as children, suggesting that the habit of eating more fruits and vegetables tracks from childhood.

Dietary trends among adults are not encouraging. Over the last 20 years, per capita fruit and vegetable availability has increased only 16 percent. In California, fruit and vegetable consumption in adults must increase by more than 25 percent to reach the minimum goal of 5 servings daily. Current national estimates are that per capita fruit and vegetable supplies are increasing about one percent per year. Long-term trends in actual fruit and vegetable consumption are not available.

Among children, the amount of fruits and vegetables eaten may be decreasing. The US Department of Agriculture has determined that fruits and vegetables are the least well consumed of the five food groups, and that for vegetables particularly, consumption by children is decreasing. The National Cancer Institute reported that the most commonly consumed vegetable by children is french fried potatoes, a major source of fat. Two University of California studies conducted with adolescent girls found that fruit and vegetable consumption had dropped 50 percent over ten years. The 1993 California Dietary Practices Survey of Children, 9-11 years, found than consumption averaged only a little more than three servings on a typical school day.

For children, fruits and vegetables are major dietary sources of many nutrients essential to growth and development, such as vitamin A, C, and folate, as well as dietary fiber and other protective plant substances. The American Academy of Pediatrics, the National Academy of Sciences, the U.S. Department of Health and Human Services, the U.S. Department of Agriculture, the California Department of Health Services, and the California Department of Education all recommend that children over two years of age eat 5 servings or more of fruits and vegetables every day.

Poor dietary practices in children are associated with iron deficiency anemia and increased susceptibility to lead poisoning, as well as obesity and high blood cholesterol. Undernutrition contributes to school absenteeism, decreased readiness to learn, poor school performance, and low self esteem. In contrast, good dietary and exercise habits support daily good health, resistance to common infections, educational attainment, and social development. Establishment of good habits also provides children with a foundation for reducing the risk of diet-related chronic diseases later in life.

What Is Being Done to Increase Fruit and Vegetable Intake in Children?

The *California Children's 5 a Day-Power Play! Campaign* is a statewide social marketing initiative of the *California 5 a Day-for Better Health! Campaign,* a public/private partnership led by the California Department of Health Services in cooperation with the National Cancer Institute. It is designed to help California's 900,000 fourth and fifth grade children and their parents eat 5 or more servings of fruits and vegetables every day by the year 2000. It does so by raising public awareness, by engaging children and their parents in a variety of promotional activities, and by stimulating supportive activity in five channels that reach children and their parents. The channels are: schools, community youth organizations, supermarkets, farmers' markets, and mass media. The activities are designed using two theories of behavior change in children: Social Learning Theory and Resiliency Theory.

The *Power Play!* Campaign is directed by the California Department of Health Services, co-sponsored by the California Department of Education, the American Cancer Society, California Division in partnership with the fruit and vegetable industry and a large number of other organizations concerned with children's nutrition. Principle funding comes from the Prevention Block Grant and Preventive Health Services Block Grant to California from the Centers for Disease Control and Prevention (CDC) and the support of partners.

OVERVIEW OF THE EVALUATION STUDY

The Evaluation Study of the *California Children's 5 a Day-Power Play! Campaign* Activities in the School Channel was designed to answer two main questions: Does children's fruit and vegetable consumption increase in the short term as a result of participation in *Power Play!* activities, and how much difference does it make if the community helps the schools. The study used an experimental design to determine the effectiveness of offering *Power Play!* activities in schools alone or through a community-wide public health approach, as compared to a control community in which no intervention activities were offered. The study took place between February and June of 1995, and a combined total of 3,966 children in 49 schools from three different communities participated. The children in all three communities completed 24-hour food diaries and questionnaires before and after the intervention. The findings from the *control* group were compared to the *school-only* intervention group, and to the *school + community* intervention group.

The study findings reported here are based on 2,684 complete matched sets of food diaries and questionnaires which measured changes in diet, knowledge, attitudes and norms, and behaviors before and after the intervention. This is the largest study ever to focus on changing the fruit and vegetable intake of children. The evaluation study was funded by the National Cancer Institute through the Centers for Disease Control and Prevention as part of the *National 5 A Day Program*.

The study was administered by a team of co-investigators from six state organizations. It was directed by the California Department of Health Services in cooperation with the California Public Health Foundation; California Department of Education; the University of California, Davis, Cooperative Extension; the University of California, San Francisco; and the University of California, Berkeley. The Child Nutrition Directors/Managers from the four participating school districts served as local study coordinators, working closely with the Curriculum Coordinator in each district. The study was staffed by a Research Associate from the California Public Health Foundation, which also administered the study. Additional consultative services were provided by a qualitative evaluation consultant and a classroom teacher.

The study was funded by a grant from the National Cancer Institute through the Centers for Disease Control and Prevention to the California Public Health Foundation. The award totaled $168,000 during the period of October, 1994 through March 31,1996. The *Power Play!* intervention activities occurred between March and May, 1995.

Study Purpose

This study expected to show that the greatest amount of change in both children and staff would occur in those schools located in the community which offered parallel activities in all five community channels targeted by the Campaign, rather than in schools alone.

Endpoints for this study included specific outcome variables associated with children's behavior change as well as measures that reflected the operation of the Campaign. The specific hypotheses were that, when delivered over an eight-week intervention period, the school-based *Power Play!* activities would:

* **Increase the practice by children of selected fruit and vegetable behaviors** including choice, preparation skills and consumption, as well as increase knowledge and establish more positive attitudes about eating more fruits and vegetables;

* **Improve specific intermediate variables**, such as having had a nutrition lesson in school, participation in the school lunch program (both factors correlate with higher fruit and vegetable consumption), other factors in the child's environment, and policies of participating organizations; and

* **Increase the intent of the school teaching and nutrition staff to repeat and/or increase their offering of *Power Play! Campaign* activities in future school years.**

DESCRIPTION OF INTERVENTION ACTIVITIES

In the *Control* site, there were no *Power Play!* activities conducted at all, but the schools were free to offer other nutrition education during this period. In the *school-only* site, teachers and the Child Nutrition staff worked together to offer at least ten different *Power Play!* activities. Some involved the cafeteria and the community, such as planning the school lunch menu and locating fruits and vegetables in different sections of the supermarket. In the *school + community* site, schools offered students the same group of at least ten *Power Play!* activities. In addition, community organizations conducted *Power Play!* activities in four additional channels that reach children and parents. The types of activities to which children and parents were exposed are highlighted below.

Power Play! Intervention Activities

Schools (occurred in school-only site and school + community site)

- Teachers and Child Nutrition Staff implemented 10 of 14 pre-selected classroom activities for students

Media (school + community site only)

- Local TV station aired four *Health Bites* during children's primary viewing hours (30-second PSAs featuring the *Power Play!* message)
- Local paper featured story on *Power Play!* Day special event

Supermarkets (school + community site only)

- Special in-store *Power Play!* displays
- *Power Play!* recipe cards
- Newspaper ads featuring *Power Play!*
- Store tours
- Coloring contests
- Fruit and vegetable donations to schools

Community Youth Organizations (school + community site only)

- Girl Scout Council *Power Play!* Patch program
- Boys and Girls Club *Power Play!* activities

Farmers' Markets (school + community site only)

- *Power Play!* Games
- Special *Power Play!* displays
- Fruit and vegetable donations to schools
- Visits to schools
- Special contests

Power Play! Day Community Event

- Community organizations sponsored student teams to exhibit chosen school recipes
- Local celebrities
- Local organizations sponsored booths with crafts, contests, exhibits
- *Power Advertising!* competition judged

A feature of the *school + community* site was a special event created by community leaders. The Salinas Valley 5 a Day Coalition designed an event in which each school participating in the *Power Play!* study would be "adopted" by a Coalition member organization. The member would then work with a small group of students selected by the teachers. Together, each member and student group were to create an original school *Power Play!* recipe, then plan and assemble an exhibit to be manned by the students on *Power Play! Day*. The Coalition decided that the sponsoring organization could spend no more than $500 for the booth materials, excluding food costs. The purpose of this activity was to engage the children in learning business concepts of marketing, merchandising, and promotion, as well as learning more about fruits and vegetables. The children were involved in preparing large volume recipes and handing out samples and printed recipes to the over-600 people attending *Power Play! Day*. Participating students wore *Power Play!* tee shirts and received the new *Kids...Get Cookin'* cookbook as gifts.

KEY FINDINGS

The consumption of fruits and vegetables prior to the intervention was lower than expected in all three study communities. The average daily intake of fruits and vegetables reported by the children prior to the intervention ranged from 2.6 to 2.9 servings in the three study sites, well short of the *Healthy People 2000* goal of at least 5 servings every day. The differences in consumption among the three sites were not significant.

* **The *Power Play!* interventions were effective when offered either by the schools alone or as part of a community-wide effort.** During the study period, **consumption rose 7 percent when *Power Play!* activities were offered in the schools only and 14 percent when *Power Play!* activities also occurred in the community at large.** Community youth organizations, supermarkets, farmers' markets, mass media, produce industry businesses, and voluntary health organizations were the community channels which sponsored additional *Power Play!* promotional activity. In contrast, **consumption dropped 12 percent in the *control* community**. During the study period, mean consumption in the two intervention groups increased to 2.9 and 3.4 servings daily, while it dropped to only 2.3 servings in the control site.

The proportion of children reaching the goal of 5 servings or more daily increased with participation in *Power Play!* activities. The percent of students who consumed 5 servings of fruits and vegetables following the intervention rose significantly in both sites, with the *school + community* site being higher than the *school-only* site. The proportion dropped significantly in the control. Interestingly, the proportion of children who did not eat any fruits and vegetables was stable at about 10-15 percent in all three sites.

* **Adverse agriculture conditions during the study period may have influenced the study results in the control and community-wide study sites.** Severe floods which destroyed crops, caused temporary unemployment, and adversely influenced the availability and cost of fresh fruits and vegetables occurred during the study period in both Northern California study communities. It is possible that under normal weather conditions, fruit and vegetable consumption in the control community would have experienced a seasonal increase, rather than dropping, while the community-wide study site might have increased even more than it did. It is possible that the *Power Play!* activities were powerful enough to buffer the effect of the adverse agriculture conditions in the community-wide intervention site.

The increases in fruit and vegetable consumption were similar among children of the three largest ethnic groups (Anglo, Latino, Southeast Asian); they occurred in the form of modest increases by many children, rather than as large increases by a few children; and they occurred in the eating occasions over which children tend to have the most control, namely breakfast, daytime snacks, and lunch. The largest increases occurred for snacks; at dinner, where children probably have the least control, no change was observed except for a decrease in the *Control*.

Children in both intervention groups significantly increased their belief that they needed to eat 5 servings of fruits and vegetables for good health. In both intervention sites, children's knowledge increased by nearly 50 percent, from about half of the children to over three-quarters; there was no increase in the control site. In the intervention sites, this variable correlated with higher consumption of fruits and vegetables.

New variables that predict increased fruit and vegetable intake were identified. These included: The child's stating that she/he would choose fruit/vegetable alternative instead of more highly promoted children's foods; helping to fix vegetables or salad at dinner; feeling that their family or the cafeteria workers are interested in what they eat; and not feeling that their friends would make fun of them if they chose fruits and vegetables over other foods. **This finding suggests that creating an environment in which eating more fruits and vegetables is considered normal and a positive way to eat will increase children's levels of intake.**

Children who reported having ever worked in a garden and eating what was grown consumed significantly more fruits and vegetables than those who had not. Further, children who gardened experienced more consumption increase from *Power Play!* than children who had not gardened. This effect was true for any place children had gardened: at school, at a youth group, at home, or with relatives.

Children who participated on a daily basis in the school lunch program appeared to eat the same amount of fruits and vegetables as those who did not participate daily, suggesting that participation provided a safety net for children with high economic need. Further, because conservative estimates were made about the amount of fruits and vegetables usually served in school lunches, if the servings were in fact larger, then children participating in school lunch would have eaten more servings than those who did not participate often.

Teachers were highly positive about offering *Power Play!* activities in the future. Of the 15 teachers who participated in follow-up interviews, over 90 percent indicated that they had plans to use *Power Play!* activities during the coming school year. All teachers indicated that they would recommend *Power Play!* to another teacher for reasons such as "...it makes nutrition interesting and fun...," it has "...easy lesson plans...," and "...children need this information."

* **Nutrition education is not widely available to fourth and fifth grade children, and teachers report many barriers to offering nutrition education. *Power Play!* significantly increased the amount of time spent by teachers on nutrition education.** Experts recommend that at least 10 hours be spent on nutrition education every school year. However, only 3 of the 36 teachers interviewed at baseline reported teaching that much nutrition education during the previous year.
The sample of teachers reported a wide range of barriers, including lack of materials, funds, and training.

SUMMARY

The deterioration of children's health practices is a national concern. In particular, fruit and vegetable consumption are low, many children are physically inactive and obesity rates have risen dramatically. These patterns have important public health implications. Although comprehensive school health education is considered a national priority, finding ways of effecting behavior change in large groups of children is a major challenge.

The *California 5 a Day-Power Play! Campaign* was designed to address one aspect of healthy eating for children: Increasing fruit and vegetable intake. It is a child-driven, user-friendly social marketing campaign which employs behavior change theory to improve children's nutrition. *Power Play!* is neither a curriculum nor a set of knowledge-driven lesson plans. Rather, in the school setting, it is intended to help teachers teach the mandatory subject areas like language, math and social studies in fun, experiential, and interactive ways that also empower children to resist negative dietary influences in their environments. In its entirety, Power Play! uses a public health approach of enlisting community youth organizations, mass media, supermarkets, and farmers' markets to help schools deliver the message of *5 a Day* to children.

* ***Power Play!* works!** This study found that the *Power Play! Campaign* delivered in the real world was highly effective over a short intervention period. It increased virtually all the variables that were tested. Most importantly, children's fruit and vegetable consumption increased significantly, and specific attitudes, knowledge, and beliefs which sustain behavior change also improved.

* **The intervention appears effective with all children.** The findings were positive for a study population which, as a whole, was lower income than the state average. This suggests that this type of intervention could be especially promising for California's vulnerable children. The results could be even more positive for children or schools with more resources.

* **If the entire community helps, children's consumption will rise the most.** The results indicate that the *Power Play! Campaign* is most effective when the community helped the schools. The community model may be even more powerful than expected; it appeared to buffer the negative effects of extremely adverse agriculture conditions, even among children with very limited economic means. This result also suggests that in a community where organizations promote healthy eating, children's fruit and vegetable consumption would improve.

* **The activities are appealing.** This study involved over 3,500 students and 150 teachers in nearly 50 schools. Nine out of ten teachers indicated they would use *Power Play!* activities again.

Conducting such a large study successfully suggests that the *Power Play!* interventions may be a practical way for schools to offer nutrition education. California has over 900,000 fourth and fifth graders in 30,000 classrooms, so having programs that are practical is critical in a time when resources are scarce.

ACKNOWLEDGMENTS AND APPRECIATION

This project required the support and participation of a great many individuals and organizations. The persons who led this research, Susan B. Foerster, MPH, RD, of the California Department of Health Services and Helen Magnuson, MPH, RD, and Sally Livingston, MA, RD of the California Department of Education, express their sincere appreciation to all who participated. Most especially, these are:

The Alisal Unified Elementary School District, the Salinas City School District, the San Diego City School District, and the control school district. Their cooperation, enthusiasm, and commitment to children's nutrition were essential to the success of the study. Special thanks go to the teachers who participated, to Brenda Burt, Suzanne du Verrier, Mary Ann Grewohl, Nancy Howe, Sharon Kimura, and Pete Summers for their leadership.

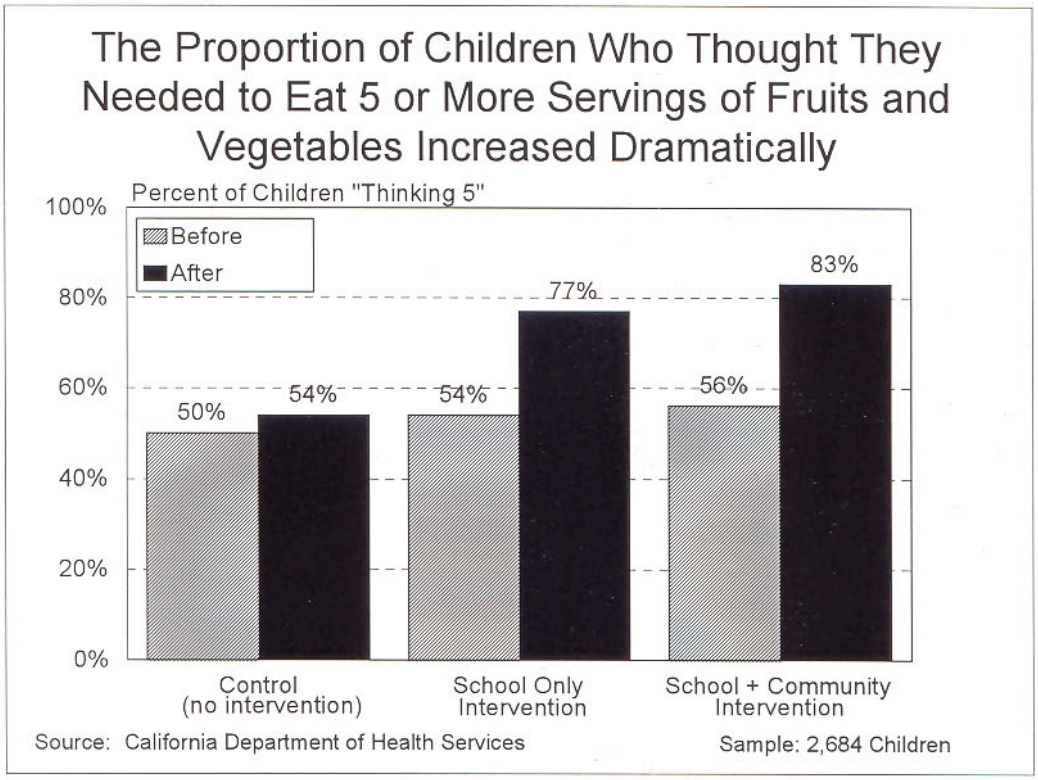
The Salinas community leaders who donated time and resources to the study

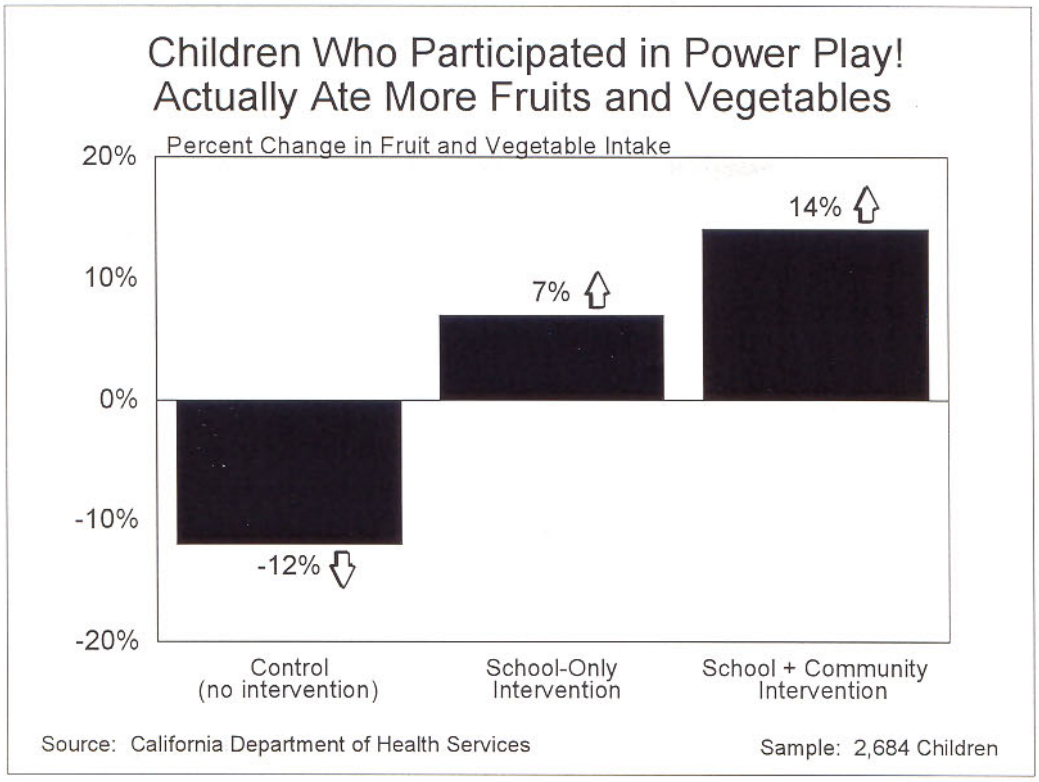
American Heart Association
American Cancer Society
Boys & Girls Clubs of the Salinas Valley
California Fresh Carrot Advisory Board
California Women for Agriculture
Edelman Public Relations
Foxy Vegetables
Frank Capurro & Son
Fresh Western Marketing
Fresh Express Farms
KCBA-TV FOX
McCain Citrus
Merril Farms
Mills Distributing
Misionero Vegetables
Monterey Bay Certified Farmers' Market
Monterey County Agricultural Education
Monterey County Project LEAN
Monterey County WIC Program
Monterey Mushrooms, Inc.
Natividad Medical Center
Nob Hill Foods
P.Wells Enterprises
Safeway Stores
Salinas Peppers
Salinas Valley Memorial Hospital
Steve Chaney & Cornelius Crow
Tanimura &Antle, Inc.
U.C. Cooperative Extension

Deborah Lane Beall, MS, RD conceptualized *Power Play!* and oversaw development of all its elements. Micheal Johnson, PhD, provided early consultation on study design. Amy Block Joy, PhD, RD, and Maradee Davis, PhD gave technical support in developing the *California Children's Food Survey,* the instrument used to measure the children's fruit and vegetable consumption. Deborah Franklin helped make the study teacher-friendly. Tanya Garbolino, Rebecca Davis, and Veronica Vasquez helped coordinate *Power Play! Day*. Regino Chávez provided evaluation consultation. Charles DiSogra, DrPH, oversaw data coding and entry. Mark Hudes, PhD, conducted all statistical analysis. Jennifer Gregson, MPH coordinated all aspects of instrument development, intervention logistics, data collection and analysis.

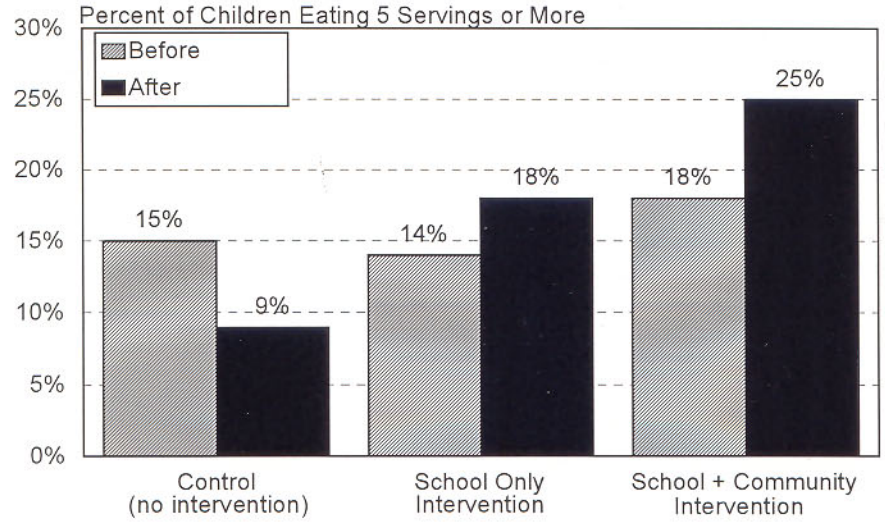
The National Cancer Institute provided financial support for this research, while the Centers for Disease Control and Prevention providing principal funding for the intervention through the Prevention and Preventative Health Services Block Grant to California. Finally, our managers gave generously of their support and encouragement. They are: David C. Riese, MPH, Dileep G. Bal, MD, and Donald O. Lyman, MD, in Health Services and Marilyn Briggs, MS, RD, Dwayne Brooks, and Jane Henderson, PhD, in the Department of Education.

APPENDIX:
CHARTS AND GRAPHS


The Proportion of Children Who Thought They Needed to Eat 5 or More Servings of Fruits and Vegetables Increased Dramatically
Percent of Children "Thinking 5"
100%
80%
60%
40%
20%
0%
Before
After
50%
54%
54%
77%
56%
83%
Control (no intervention)
School Only Intervention
School + Community Intervention
Source: California Department of Health Services
Sample: 2,684 Children


Children Who Participated in Power Play! Actually Ate More Fruits and Vegetables
Percent Change in Fruit and Vegetable Intake
20%
10%
0%
-10%
-20%
-12%
7%
14%
Control (no intervention)
School-Only Intervention
School + Community Intervention
Source: California Department of Health Services
Sample: 2,684 Children

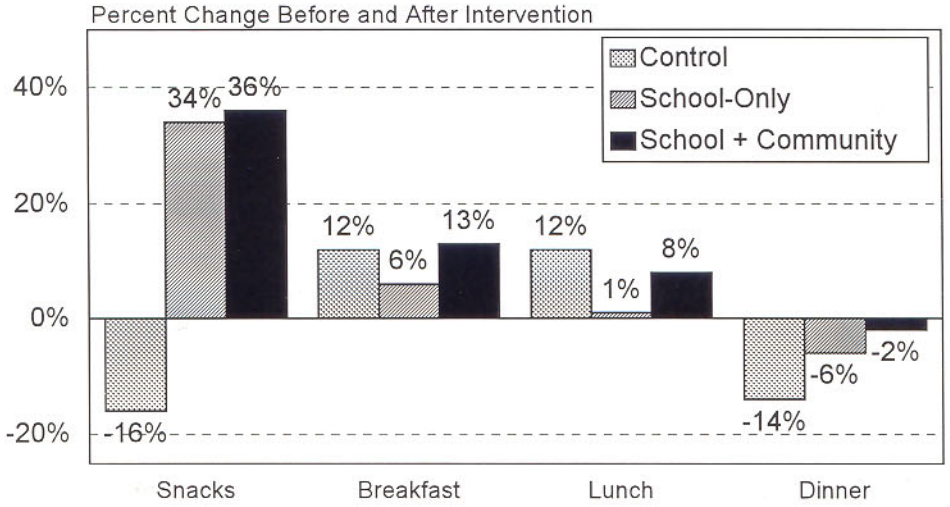
The Proportion of Children Reaching the 5 A Day Goal Increased with Power Play! Participation



Source: California Department of Health Services

Sample: 2,684 Children

Improvements in Children's Consumption Tended to Occur for Eating Occasions Over Which They Had the Most Influence



Source: California Department of Health Services

Sample: 2,684 Children

5 Easy Ways to Help Kids Eat More Fruits and Vegetables
5 A Day Tips for Parents

- Teach kids to eat 5 or more servings of fruits and vegetables every day. Kids who think they need 5 servings for good health eat more.
- Serve fruits and vegetables at children's parties and celebrations
- Have your kids help fix vegetables or salads for dinner
- Take an interest in what your kids are learning at school about fruits and vegetables.
- Start a garden. Kids who have worked in a garden tend to eat more fruits and vegetables.

Source: California Department of Health Services