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Teachers' Perceptions Indicate Success for Harvest of the Month Nutrition Education Program

Kristen Evans, Keiko Goto, Cindy Wolff, Martin Frigaard and Stephanie Bianco-Simeral

California State University, Chico

Abstract

The objective of this study was to examine teachers' attitudes, beliefs, classroom practices and perceptions of students' nutrition-related behaviors. The study involved 419 K-6th grade teachers participating in the Harvest of the Month (HOTM) program in fifty low-income schools from 19 school districts in the Sierra Cascade region of northern California. The independent variables were the teachers' implementation level of the HOTM program and encouragement level of vegetable and fruit consumption. The dependent variables were teachers' attitudes and beliefs about their ability to provide nutrition education, classroom practices and their perceptions of students' nutrition-related behaviors. Data were analyzed using descriptive statistics and multiple ordinal logistic regression models. The analysis accounted for number of years teaching, county location of school, and grade. Implementation level of the HOTM program was significantly related to teachers' perception of student nutrition-related behaviors. Additionally, teachers' perceptions of improvements in their students' behaviors were positively associated the level of encouragement they report to give their students to consume fruits and vegetables. Therefore, levels of both HOTM program implementation and fruit and vegetable consumption encouragement were associated with positive outcomes. Study results support the effectiveness of the HOTM program and identify a need for teacher trainings to increase the levels of nutrition education and encouragement for students to make healthier food choices.

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Keywords: Elementary school students, school-based nutrition education, teachers, fruit and vegetable consumption, Harvest of the Month

Introduction

Childhood obesity remains a paramount public health concern in the United States. The overweight and obesity rates in California and in northern California including Butte, Tehama, and Glenn Counties, exceed the national average of 31.7% (Ogden and Carroll, 2010). According to the 2008 California Pediatric Nutrition Surveillance, the overweight and obesity state rate for youth ages 5-19 years old was 41.1%, representing an increase of nearly five percent since 1999 (Polhamus, Dalenius, Mackentosh, Smith, & Grummer-Strawn, 2009a).

The evidence of dietary behaviors that contribute to high obesity rates among children is equally concerning. The epidemiological evidence indicates an association between overweight status and a diet containing high amounts of soft drinks, fats and oils, and sodium. The opposite is true for diets that include plentiful fruits, vegetables, legumes, low-fat milk and other animal products (Boumtje, Huang, Lee, & Lin, 2005). Additionally, diets higher in fruits and vegetables are protective against numerous chronic illnesses and unhealthy weight gain throughout adulthood (Hu, 2003; Hung et al., 2004; Riboli & Norat, 2003).

School-based Nutrition Interventions

If parents are the gatekeepers of a child's home nutrition environment, then schools represent the "gatekeepers of nutritionally sound practices in the education environment" (Sorof, Lai, Turner, Poffenbarger & Portman, 2004). A school day provides teachers and staff with the opportunity

to assist in establishing healthy behaviors (Kropski, Keckley, & Jensen, 2008; Story, Nanney, & Schwartz, 2009). Nutrition education interventions have been conducted in the school environment to help support and sustain these healthy behavior changes. The most effective interventions have used multicomponent strategies that include fruit and vegetable tastings, cooking demonstrations, fruit and vegetable storybooks, garden-enhanced nutrition education, parent flyers, parent involvement, cafeteria posters, school foodservice staff encouragement, stickers and other incentives, classroom curricula, positive role modeling, and physical activity promotion (Blanchette & Brug, 2005).

Effects of School-based Nutrition Interventions on Fruit and Vegetable Consumption

An essential evaluation component of nutrition education interventions is fruit and vegetable consumption. Nutrition education programs that incorporate frequent exposure to unfamiliar foods are successful at increasing rates of fruit and vegetable consumption (Knai, Pomerleau, Lock, & Mckee, 2006; Lakkakula et al., 2011; Wardle et al., 2003). In similar research, sixth-grade adolescents who participated in nutrition education with garden-based activities increased their fruit and vegetable intake more than comparison groups (McAleese & Rankin, 2007). Voorhees et al. (2011) demonstrated that when students had previously tasted a fruit or vegetable they were more likely to eat it (Voorhees, Goto, Bianco-Simeral, & Wolff, 2011).

Teachers' Roles in School-based Nutrition Interventions

Multicomponent school-based nutrition education programs provide teachers with a variety of tools to positively influence nutrition behaviors. Teachers consistently report high preferences for nutrition curriculum programs that promote fruits and vegetables through tastings and associated in-class lessons (Blom-Hoffman, 2008; Perry et al., 2004; Reinaerts, De Nooijer, Candel, & De Vries, 2006; Reynolds et al., 2000; Wang et al., 2010; Wood, Wolff, Bianco-Simeral, & Goto, 2011).

Research indicates that higher levels of implementation of program elements (fruit and vegetables tastings, cooking demonstrations, classroom curriculum) may be associated with higher levels of fruit and vegetable consumption among students (Wang et al., 2010; Wood, Wolff, Bianco-Simeral, & Goto, 2011). Story and colleagues (2000) implemented a nutrition education program that consisted of behavioral classroom curriculum, parental involvement, and food service modifications. They reported that positive feedback was received from teachers about the effectiveness of their curriculum, the importance of eating fruits and vegetables, and a high level of self-efficacy in being able to teach the program content. Teachers also reported that their own usual fruit and vegetable consumption increased after teaching the curriculum (Story et al., 2000). A similar study has also shown that teachers tend to be confident in their ability to provide multicomponent nutrition education programs to students (Reinaerts, De Nooijer, & De Vries, 2007).

Evidence indicates that levels of implementation and the teachers' encouragement of multicomponent nutrition messages positively affect student outcomes, such as increased fruit and vegetable consumption (Knai, Pomerleau, Lock, & Mckee, 2006; Lakkakula et al., 2011; Wardle et al., 2003). These findings indicate that teachers' attitudes, beliefs, and level of both program implementation and encouragement of program components desired behavior changes can influence student outcomes.

Harvest of the Month Program

The Harvest of the Month Program (HOTM) was created by the Network for a Healthy California as a multicomponent school nutrition curriculum program that is standardized, cost effective, replicable, and convenient. The Network for a Healthy California is a statewide social marketing program and is funded in part by the United States Department of Agriculture (USDA). The HOTM curriculum provides teachers and schools with materials and activities that correspond with a monthly featured produce item. This comprehensive curriculum includes fruit and vegetable tastings, classroom cooking demonstrations, cafeteria

posters showcasing nutritional information and meal options, story books related to the monthly fruit or vegetable, Farmer of the Month newsletters promoting farm to fork, HOTM newsletters for parents, and HOTM classroom workbooks. The HOTM objectives are to assist teachers and schools in efforts to improve students' access, preference, and knowledge of fruits and vegetables (especially those grown locally in California); as well as increase daily physical activity (Network for a Health California, Harvest of the Month Program, 2007). This program attempts to unite the classroom, cafeteria, home, and community to promote healthy behaviors, specifically in low resource schools (Network for a Health California, Harvest of the Month Program, 2007).

Previous research on teachers participating in the Harvest of the Month (HOTM) program reported a positive change in student nutrition-related attitudes and behaviors and teachers' classroom practices (Wood, Wolff, Bianco-Simeral, & Goto, 2011). Though studies have been conducted on specific components of the HOTM program, there remains a scarcity of research specific to the impact of levels of program implementation or encouragement of fruit and vegetable consumption on teachers' classroom practices and their perceptions of student behavioral outcomes.

The primary objective of this study was to evaluate the impact of teachers' implementation level of six components of the HOTM program on teachers' attitudes and beliefs about nutrition education, teachers' classroom practices, and teachers' perceptions of student behaviors. The association between the encouragement level of fruit and vegetable consumption during the intervention and teachers' perceptions of student behaviors was also investigated. The current study provides insight into the relationship between classroom environments, teacher nutrition-related perspectives, and the teachers' discernment of changes in student health behaviors. Findings also have implications for the interaction between classroom practices and districts' school wellness policy implementation.

Methods

Study Design

The current study includes a post survey with an intervention group only. Intervention schools receiving the HOTM program have a $\geq$ 50% student participation rate in the free or reduced price National School Meal Program.

Participants and Recruitment

Survey participants were elementary school teachers in the Sierra Cascade region of California who participated in the HOTM program during the current school year. Surveys were distributed to teachers during the last month of the school year. No incentives were provided for completing in the survey and teachers were not required to complete the survey in order to continue their participation in the HOTM program. A total of 753 surveys were distributed to K-6th grade teachers in 49 schools in 19 participating school districts in four counties (Butte, Glenn, Tehama, and Colusa). The overall survey response rate was 55.6% (n = 419 teachers). This response rate is consistent with previous years of HOTM survey collection (Wood, Wolff, Bianco-Simeral, & Goto, 2011). The on-line SurveyMonkey response rate for the one school district out of 19 using this method of survey distribution was 61.5%. This study and its procedures were approved by the California State University, Chico Human Subjects Research Committee. Consent for participation in teacher surveys was obtained via signed letters from school administrators.

Measurement Tool

A two-page teacher survey was used to evaluate process and outcome measures for HOTM participation. The original teacher survey was created in 2005 and has been revised each year in order to streamline the survey and refine on-going data collection methods. The current survey was adapted from the survey used by Wood, Wolff, Bianco-Simeral and Goto (2011) in a previous evaluation of the HOTM program. The modified survey included additional questions assessing school wellness policy knowledge and implementation. The survey was approved by the Network for a Healthy

California's Research and Evaluation Division.

The process evaluation section of the survey was comprised of a list of the of the HOTM program components. Teachers were asked how many months during the current school year they had participated in each of the six HOTM components listed below.

1. Fruit and vegetable tastings
2. Classroom cooking demonstrations
3. 'Do-It-Yourself' classroom tastings
4. Book of the month activities
5. Farmer of the month flyer discussions
6. Student workbook activities

The survey outcome variables of interest consisted of the following: six statements addressing how often teachers were encouraging healthy classroom practices which were coded "Never," "1x/ mo.," "2-3x/mo.," "1x/wk.," "2-4x/wk.," and "Every day."; eight statements about the teacher's classroom practices in relation to nutrition which were coded "Always," "Frequently," "Sometimes" and "Never."; and five statements addressing the teacher's perceptions of student behaviors. Examples of these statements included: "students are more willing to taste a new fruit or vegetable. There were seven statements referring to teachers' attitudes and beliefs about nutrition education. Examples of these statements included: "I am confident in my ability to provide nutrition education," and "I am confident that if I teach nutrition, my students will increase their nutrition knowledge." All items addressing teachers' perceptions, attitudes and beliefs were ranked on a 4-point Likert scale and later recoded to a 3-level scale (3 = "Strongly Agree," 2 = "Agree," 1 = "Disagree/Strongly Disagree).

Lastly, three survey questions addressed teachers' knowledge and adherence to school wellness policies. These statements included, "I know the details of my district's school wellness policy," "I follow my district's school wellness policy," and "My school/school district follows the school wellness policy."

The independent variables for this study were the teachers' implementation level of the HOTM program and encouragement level of fruit and vegetable consumption. The dependent variables included teachers' attitudes and beliefs about nutrition education, classroom practices, perceptions of students' behaviors, and teachers' knowledge and adherence to school wellness policies.

Procedures

The survey was distributed and collected during the spring of 2011. The survey was made available as a paper and digital copy (via SurveyMonkey), and teachers were notified about the option to complete the survey through email and school district staff meetings. All teachers had one week to complete the survey. Researchers collected the completed surveys from the schools and downloaded the completed online surveys at the culmination of the data collection period.

Data Analysis

To measure program implementation, a new variable was created to indicate the quantity and frequency of program elements that each teacher used during the school year. This new scale was created by summing the six variables that were used to measure the implementation levels of individual program components identified previously. Teachers implementing three or more components per month for the entire school year (≥27 total HOTM activities/year) were coded high implementers (HI). In contrast, teachers who implemented less than three components per month during the school year (<27 of total HOTM activities) were considered low implementers (LI). This new measure had a range of 0 to 54, and the average number of HOTM activities implemented was 25.6 over the course of the school year. Using this categorization method yielded approximately equal numbers of teachers in the two groups: 208 high implementers (HI) and 211 low implementers (LI). This new measure enabled an examination of the relationships among implementation level and the teachers' classroom practices, attitudes and beliefs about

nutrition education, perceptions of student behaviors, and teachers' knowledge and adherence to school wellness policies.

The "teachers' encouragement level" variable was created by recoding the existing survey responses into an independent variable representing the encouragement level of fruit and vegetable consumption. The teachers reported encouraging students to eat vegetables and fruits as "Always," "Frequently," and "Sometimes." "Never" was included as a survey item, but not in the independent variable given that only one teacher reported never encouraging students to eat fruits and vegetables. This variable allowed an investigation into the relationship between encouragement level and teachers' perceptions of student behaviors.

Data were analyzed using SPSS version 19, 2011, SPSS Inc, Chicago. IL. Descriptive statistics were computed for all variables and were presented as percentages, means, and standard deviations. Ordinal logistic regression models were used to test the hypotheses that levels of both HOTM program implementation and encouragement of fruit and vegetable consumption were predictors of the teachers' classroom practices, attitudes and beliefs about nutrition education, perceptions of student behaviors, and knowledge or adherence to school wellness policies. Covariates in this analysis included grade, number of years teaching, and county location for schools (Butte, Glenn, Tehama, or Colusa). These multiple regression analyses were used to calculate odds ratios and confidence intervals for dependent variable scores. The odds ratio represents the likelihood that higher level responses for independent variables (i.e., "Always") were associated with higher level responses on dependent outcome variables (i.e, "Strongly Agree"). The level of $\leq$ 0.05 was used to indicate statistical significance.

Table 1

K-6 Teachers by Grade for 2010-2011 School Year

			Average Number of Years Teaching	
Grade	**Teachers**	**%**	**Mean**	**SD**
Kindergarten	67	16	17.9	8.3
1st	61	14.6	16.6	9.4
2nd	71	16.9	17.2	8.1
3rd	71	16.9	18.1	7.8
4th	58	13.8	16.2	7.7
5th	57	13.6	17.5	8.9
6th	34	8.1	12.9	6.7
Total	419	100	16.9	8.3

Results

Description of Sample

Table 1 shows descriptive statistics for the 419 teachers who completed the survey. The overall average number of years spent teaching was 16.9. As presented in Table 2, independent samples t-test results indicate that high implementers (HI) and low implementers (LI) differed from each other on various outcomes. HOTM program components achieving the highest levels of implementation (ranging from 1 – 9 times per year) among all teachers included fruit and vegetable tastings (M = 8.66 ; SD = 1.41), Farmer of the Month flyer (M = 6.32; SD = 3.65), and student workbooks (M = 4.41; SD = 3.90). Teachers in the HI group were significantly more frequent users of all six

program components with the highest rates for the Book of the Month, Farmer of the Month flyer, and student workbook components of the program.

Table 2

Mean Scores of Harvest of the Month (HOTM) Activities by Implementation Group[a]

Harvest of the Month Program Components	Higher Implementers[b] (n=208, 49.6%)		Lower Implementers (n=211, 50.3%)	
	Mean	SD	Mean	SD
1. Fruit and vegetable tastings***	9.00	0.07	8.33	1.93
2. Cooking demonstrations***	1.65	2.58	0.55	1.11
3. DIY (Do-It-Yourself) tastings***	3.06	3.61	1.00	1.95
4. Book of the month***	4.95	3.65	1.50	2.30
5. Farmer of the month flyer***	8.13	2.21	4.54	3.90
6. Student workbooks***	6.40	3.48	2.45	3.25
Avg. # of total HOTM components***	33.19	15.60	18.37	14.44

Note. [a]Groups based on 54 total possible number of activities (6 components x 9 monthly activities/year = 54); [b]higher Implementers = teachers implementing ≥27 of total HOTM activities, lower implementers = teachers implementing <27 of total HOTM activities; *** $p < 0.001$.

Implementation Level and Teachers' Attitudes and Beliefs

Teachers' attitudes and beliefs about nutrition education by level of HOTM implementation groups were examined using ordinal logistic regression controlling for grade, number of years teaching, and school county location. HI teachers, in comparison with LI teachers, were significantly more likely to report higher Likert responses for all survey items pertaining to attitudes and beliefs about nutrition education ($p < 0.05$).

Implementation Level and Teachers' Classroom Practices

Ordinal logistic regression was used to compare teachers' classroom practices between HI and LI groups controlling for grade, number of years teaching, and county location of school. Teachers in the HI group were significantly more likely to report "Always" and "Frequently" for the statement, "I involve parents in nutrition education classroom activities" ($p < 0.001$).

Implementation Level and Teachers' Perceptions of Student Behaviors

Ordinal regression models indicated significant relationships between teachers' perceptions of student behaviors and implementation level groups. As with previously reported regression models, grade, number of years teaching, and county location of school were included as covariates. As shown in Table 3, HI teachers were significantly more likely to report higher Likert scores compared to their LI counterparts for all student behaviors. For example, the odds of reporting higher Likert scores for the statement, "students are more receptive to tasting/eating vegetables," were 2.5 times higher among HI teachers compared to LI teachers.

Table 3

Adjusted Odds Ratios for Teachers' Perceptions of Student Behaviors by Level of Harvest of the Month Implementation

Dependent[a] (Outcome Variables)	Implementation Group	OR[b]	95% CI
Students express more interest in improving their eating habits***	High Implementers	2.29	1.46-3.56
	Low Implementers	1.00	
Students express more interest in increasing their physical activity***	High Implementers	2.11	1.35-3.31
	Low Implementers	1.00	
Students are more receptive to tasting/eating vegetables***	High Implementers	2.47	1.61-3.81
	Low Implementers	1.00	
Students are more receptive to tasting/eating fruits*	High Implementers	1.93	1.26-2.96
	Low Implementers	1.00	
Students show less interest in drinking soda and sweet drinks	High Implementers	1.30	0.86-1.97
	Low Implementers	1.00	

Note. [a]Dependent variables are on a 3-level scale (3 = Strongly Agree, 2 = Agree, 1 = Disagree/Strongly Disagree); HI = higher implementers; LI = lower implementers; [b]covariates include "years as a teacher," "county location," and "grade;" OR = odds ratio; C.I. = confidence interval; * $p < 0.05$, *** $p < 0.001$.

Encouragement Level and Teachers' Perceptions of Student Behaviors

The current study also examined the impact of teachers' encouragement level of fruit and vegetable consumption compared to the teachers' perception of student behaviors, once again controlling for grade, years of teaching, and school county location (Table 4). In this ordinal regression model, teachers providing higher levels of encouragement were significantly more likely to report higher Likert scores for student behaviors.

Implementation and Encouragement Levels and School Wellness Policies

Neither implementation level of the HOTM program nor encouragement level of fruit and vegetable consumption was a significant factor for teachers' statements addressing school wellness policies (i.e. "My school/school district follows the school wellness policy", "I know the details of my district's school wellness policy" and "I follow my district's school wellness policy").

Table 4

Adjusted Odds Ratios of Teachers' Perceptions of Student Behaviors by Encouragement Level of Fruit & Vegetable Consumption

Dependent Variables[a]	Encouragement Level	OR	95% CI[b]
Students express more interest in improving their eating habits	Always***	4.91	2.48-9.72
	Frequently	1.79	0.94-3.98
	Sometimes	1.00	
Students express more interest in increasing their physical activity	Always***	3.03	1.57-5.84
	Frequently	1.78	0.95-3.34
	Sometimes	1.00	
Students are more receptive to tasting/eating vegetables	Always***	3.20	1.69-6.07
	Frequently	1.70	0.92-3.12
	Sometimes	1.00	
Students are more receptive to tasting/eating fruits	Always**	2.81	1.50-5.23
	Frequently	1.52	0.86-2.75
	Sometimes	1.00	
Students show less interest in drinking soda and sweet drinks	Always**	2.76	1.49-5.11
	Frequently	1.65	0.92-2.97
	Sometimes	1.00	

Note. [a]Dependent variables are on a 3-level scale (3= Strongly Agree, 2= Agree, 1 = Disagree/Strongly Disagree); [b]covariates include "years as a teacher," "county," and "grade;" OR = odds ratio; C.I. = confidence interval; ** $p < 0.01$, *** $p < 0.001$.

Discussion

The purpose of this investigation was to evaluate the influence of teachers' implementation level of HOTM program components on their attitudes and beliefs about nutrition education, nutrition-related classroom practices, and perceptions of student behaviors. The findings in this study indicate that higher levels of implementation of the HOTM program are associated with positive teacher attitudes and beliefs about nutrition education as well as their perceptions of changes in their students' behaviors. Higher implementation level was also associated with increased involvement of parents in classroom nutrition activities. This study also discovered that higher encouragement levels of fruit and vegetable consumption are associated with a positive perception of student behaviors. These findings are consistent with previous research suggesting that teachers can be effective in influencing dietary behaviors including the increased consumption of fruits and vegetables (Kropski, Keckley, & Jensen,

2008; Reinaerts, De Nooijer, & De Vries, 2007; Story, Nanney, & Schwartz, 2009; Wang et al., 2010; Wood, Wolff, & Bianco-Simeral, Goto, 2011).

The elements of the Harvest of the Month program achieving the highest levels of implementation included the fruit and vegetable tastings, Farmer of the Month flyer, and student workbooks. Fruit and vegetable tastings are consistently among the most implemented components of nutrition education programs, possibly due to the effectiveness of repeated exposures in eliciting increased consumption (Knai, Pomerleau, Lock, & Mckee, 2006; Lakkakula et al., 2011; Voorhees, Goto, Bianco-Simeral, & Wolff, 2011). Blom-Hoffman (2008) also reported similar teachers' preferences among other components (e.g., CD-ROM, AM announcements, lunchtime stickers, take-home books) and their effectiveness in improving students' nutrition behaviors (Blom-Hoffman, 2008). Related research has also demonstrated that student preferences for fruits and vegetables increased in high program implementation schools (Reinaerts, De Nooijer, Candel, & De Vries, 2006; Wang et al., 2010). The combination of these findings suggests that the effectiveness of the HOTM program to influence students' preference for and consumption of fruits and vegetables is contingent upon teachers implementing numerous components of the program.

Our findings show that higher teacher implementation levels of program components are associated with teachers' positive attitudes and beliefs about providing nutrition education to children. A similar relationship was found between implementation levels and the types of foods promoted at classroom celebrations (i.e., "I promote other birthday treats, besides high sugar, high fat foods like cake or cookies"), as well as involving parents in nutrition education. These findings are not surprising, considering it is plausible that teachers with positive attitudes and beliefs about nutrition education would likely use more HOTM components in their classroom.

This evaluation indicated that approximately 82% of the teachers in this sample reported that they "Always" (35.4%) or "Frequently" (47.4%) encouraged students to eat vegetables and fruits. According to previous investigations, teachers involved in a multicomponent nutrition education program reported high preference and implementation rates for both the curriculum lessons and the tasting activities (Perry et al., 2004; Reynolds et al., 2000; Reinaerts, De Nooijer, Candel, & De Vries, 2006; Story et al., 2000; Wang et al., 2010). Teachers with the highest encouragement levels of fruit and vegetable consumption also reported higher scores for all student behaviors, such as improved receptiveness to trying fruits and vegetables and increased interest in physical activity. This finding implies that if teachers presume that they are encouraging fruit and vegetable consumption, then they might also perceive that they are positively affecting their students' behaviors. This finding is consistent with previous research showing that verbal encouragement by food service staff was significantly associated with increased consumption of fruits and vegetables (Perry et al., 2004).

In summary, higher implementation of the HOTM program components is linked to significantly higher scores for variables related to teachers' attitudes, beliefs, classroom practices, and perception of student behaviors. Results also show that higher encouragement levels of fruit and vegetable consumption is linked to higher scores on teachers' perceptions of student behaviors (interest in improving their eating habits, less interest in drinking soda and sweet drinks, and more receptive to tasting/eating fruits and vegetables). These findings are similar to recent research measuring teachers' discernment of student nutritional behaviors (Wood, Wolff, & Bianco-Simeral, Goto, 2011). The current study indicates that multicomponent programs such as HOTM may improve teachers' abilities to effectively encourage their students to adopt healthful nutrition-related behaviors.

Limitations

The study's methodology was limited by the post-only design and the lack of a control group. A pre/post or longitudinal intervention research design with a control group would have allowed the authors to see any behavior changes over the course of the school year. Additionally, outcome variables for students' behaviors were reported as perceptions by teachers, rather than more objective measurements of students' behaviors on diet and physical activity. Finally, because the overall survey response rate was only 55.6%, our findings might not be representative of all teachers who were involved in the HOTM program.

Conclusion

The Harvest of the Month program appears to be an effective method for promoting positive nutrition-related behaviors among elementary school teachers and students. Levels of program implementation and encouragement of fruit and vegetable consumption were significant factors associated with teachers' perceptions of improvements in student behavioral outcomes. Our findings also support previous research on the preference and effectiveness of multicomponent tasting programs in promoting nutrition-related behavior changes in the school environment. Barriers that affect multicomponent program implementation and encouragement, such as program complexity and feasibility of acquiring program elements, need to be identified and mitigated to ensure program success (Reinaerts, De Nooijer, & De Vries, 2007).

It is possible that nutrition education interventions could be further integrated with school wellness policies. The relationship between teachers' knowledge of knowledge and adherence to school wellness policies was insignificant in this investigation and should be addressed in future research.

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Author Information
Kristen Evans, MS
Former Graduate Student
California State University, Chico

Keiko Goto, PhD*
Associate Professor
Department of Nutrition and Food Sciences
Assistant Director of Research and Evaluation
Center for Nutrition and Activity Promotion
California State University, Chico
Address: Chico, CA 95929-0002
Telephone number: 530-898-6767
Fax: 530-898-5586
E-mail address: kgoto@csuchico.edu

Cindy Wolff, PhD, MPA, RD
Director, Center for Nutrition and Activity Promotion
Professor, Department of Nutrition and Food Sciences, California State University, Chico

Martin Frigaard, MA
Research Assistant, Center for Nutrition and Activity Promotion
Lecturer, Department of Kinesiology,
California State University, Chico

Stephanie Bianco-Simeral, MS, RD
Associate Professor, Department of Nutrition and Food Sciences
Assistant Director of Operations, Center for Nutrition and Activity Promotion, California State University, Chico

* corresponding author

Impact of a Kindergarten through Eighth-Grade Nutrition Education Program on Student, Teacher, and Schoolwide Practices

Lara Wood, MS; Cindy Wolff, MPA, PhD, RD; Stephanie Bianco-Simeral, MS, RD; Keiko Goto, PhD

INTRODUCTION

Low-income children are especially at risk for low fruit and vegetable consumption. Diets lacking in fruits and vegetables are associated with chronic diseases. Successful school-based interventions are key to promoting the consumption of fruits and vegetables. Research has shown that the degree of teacher involvement has a significant impact on students' and parents' interest in and compliance with school-based nutrition programs.[1] Additionally, teachers have the predominant role in deciding which materials to use and how often to use them for a nutrition intervention.[2] These studies indicate that teachers have authority over the degree of program implementation, and the more they implement, the greater the impact on students. However, some teachers' knowledge and understanding of nutrition education may be limited since the importance of a healthful school environment is not always emphasized in teacher training or school policies.[3] Thus, assessing teacher program implementation level (process evaluations) and their perceptions of program impact (impact evaluations) on students and on classroom and schoolwide practices are important components of a nutrition education program evaluation. However, few evaluations of this nature, particularly longitudinal evaluations, are reported in the literature. This GEM article reports teachers' perception of program impact on students and on classroom and school-wide practices using a cross-sectional survey.

PROJECT DESCRIPTION

The Sierra Cascade Nutrition and Activity Consortium (SCNAC) provides nutrition education services to 12 low-income school districts in northern California. The SCNAC evaluated their adaptation of the *Network for a Healthy California* Harvest of the Month (HOTM) program for 3 school years: 2006, 2007, and 2008. Every month during the 9-month school year, students in kindergarten through sixth grade tasted a different fruit or vegetable and participated in related activities. The program is designed to motivate students to increase their preference for and consumption of a variety of fruits and vegetables. In addition to tastings, teachers received educator newsletters providing strategies for the incorporation of HOTM information with classroom curricula and a flyer with information about the farmer who provided the fruit and vegetable samples. Provision of story books highlighting HOTM fruits and vegetables provided teachers and librarians with another curricula-based tool for message reinforcement.

EVALUATION AND RESULTS

Our process and impact evaluation assessed the level of SCNAC program implementation, as well as the impact of the program at the classroom and school levels. Survey respondents included 190 teachers from 12 schools in 2006, 283 teachers from 32 schools in 2007, and 296 teachers in 33 schools in 2008. The response rate was 54%. The authors measured teachers' level of program implementation, satisfaction with SCNAC materials and activities, program-associated changes in classroom practices, and perceptions of the program's impact on students' nutrition-related attitudes and behaviors. The survey included 41 five-point Likert statements and 3 open-ended questions. Content validity was confirmed by nutrition faculty and SCNAC nutrition education specialists. The survey was pilot-tested with teachers for face validity.

Chi-square tests were used to assess differences between level of program participation and teachers' perceptions of student receptivity to fruits and vegetables, as well as teachers' classroom-related practices. Changes in teachers' perceptions among the 2006, 2007, and 2008 school years were analyzed using analysis of variance.

Findings for the 2008 survey showed that 93% of teachers reported that they conducted HOTM taste tests 5 or more times a year. This number is notably higher than the 69% of

Center for Nutrition and Activity Promotion, Department of Nutrition and Food Sciences, California State University–Chico, Chico, CA
STATEMENT OF POTENTIAL CONFLICT OF INTEREST AND FUNDING/SUPPORT: See page S147.
Address for correspondence: Cindy Wolff, MPA, PhD, RD, Center for Nutrition and Activity Promotion, Department of Nutrition and Food Sciences, California State University–Chico, Chico, CA 95929-0235; Phone: (530) 898-5288; Fax: 530 898-5382; E-mail: cwolff@csuchico.edu
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teachers participating in a 5-a-Day program evaluation who selected HOTM as the program highlight.[4] For the present study, 60% of the 2008 teacher respondents were classified as high implementers (>15 SCNAC activities per year) and 40% were classified as low implementers (≤15 activities per year). Teachers who were high implementers were significantly more likely to strongly agree that their students were more receptive to eating fruits ($P = .001$) and vegetables ($P = .003$) compared to low implementers, as shown in the Table. High implementers were also significantly more likely to strongly agree that their students were motivated to improve their eating habits. Additionally, there were significant differences in the mean score for teachers' perceptions that students were less interested in soda between high (mean = 3.56) and low (mean = 3.33) levels of program implementation ($P = .043$). These findings are consistent with the 5-A-Day Power Plus program results that showed that fruit, juice, and vegetable consumption was higher in schools with higher levels of program implementation.[5]

Teachers' responses to open-ended questions indicate that the program was well received by both teachers and students. The following statements exemplify teacher responses to the request to identify what SCNAC activity had the greatest impact on their students: "Tasting fruits and vegetables; some children tasted things they thought they wouldn't like" and "Harvest of the Month: children start out saying they don't like the fruit/vegetable, but end up wanting more when they try it."

Cumulative data from the 3-year evaluation period indicate that teachers perceive positive classroom outcomes including more healthful classroom snacks and the adoption of a food policy specifying guidelines, such as no candy in the classroom and suggestions for fruit and vegetable classroom snacks. Higher implementers were significantly more likely to strongly agree that there had been a positive change toward more-healthful classroom snacks ($P = .001$) and that they have a food policy in their classroom ($P = .006$).

Not only does more implementation appear to enhance impact on behavior change, but program longevity seems to as well. Means for all survey Likert statements increased each year for 2006, 2007, and 2008. Differences among means achieved statistical significance for the following 8 statements: (1) students are motivated to improve their eating habits; (2) students are receptive to tasting/eating vegetables; (3) students are receptive to tasting/eating fruit; (4) there has been a decrease in the use of food as a reward; (5) there has been a decrease in the use of candy, cookies, and so on for fundraisers; (6) I have made efforts to decrease the presence of high-sugar, high-fat food in my classroom; (7) I have a food policy for my classroom that limits high-sugar, high-fat food; and (8) level of satisfaction with impact of food tastings on students. The results suggest that program longevity contributes to positive changes. In contrast, no significant change across the years was found for the schoolwide practices statement, "My school has become more supportive of healthful eating and activity patterns" ($P = .18$).

Table. Harvest of the Month Implementation Level Compared with Perceived Student Receptivity to Fruits and Vegetables (n = 296)

	Level of Agreement with Likert Statement for Student Receptivity	HOTM Implementation, n (%) Low[a] (n = 119)	High[b] (n = 177)	*P*
Fruit	Less agreement	62 (52%)	57 (32%)	.001
	Strong agreement	57 (48%)	120 (68%)	.001
Vegetables	Less agreement	68 (57%)	70 (40%)	.003
	Strong agreement	51 (43%)	107 (60%)	.003

HOTM indicates Harvest of the Month.
[a]Low implementation indicates 0-8 activities per school year; [b]High implementation indicates ≥ 9 activities per school year.
Note: Less agreement includes agree, neutral, disagree, and strongly disagree. Percentages are within implementation levels.

FUTURE DIRECTIONS

Teachers reporting higher levels of nutrition education implementation also report higher levels of program impact. In addition, program outcomes improved each year over this 3-year study. The use of both process and impact data was pertinent to the findings of this evaluation. Impact evaluation alone does not reveal the important contribution of program implementation level. The present findings support the effectiveness of *Network for a Healthy California* nutrition education programs.

There are 2 limitations in this study. Unfortunately, the authors did not have the ability to match teachers across years, so they cannot report whether the same teachers are responding year to year. In addition, this study relied solely on self-reports. In spite of these limitations in design, this study provides information important to the development and implementation of similar interventions and evaluations. Additional research is recommended to examine the effects of teachers' multi-year participation in the HOTM program on students and on classroom and schoolwide practices, possibly using surveys combined with observations. The authors are currently conducting a 3-year follow-up study with responses matched by teacher year to year. The use of this data collection method will allow the authors to match teachers year to year and to track their movement from school to school within a district and from district to district.

NOTES

The survey was approved by both the *Network for a Healthy California* and the Institutional Review Board at the California State University, Chico.

STATEMENT OF POTENTIAL CONFLICT OF INTEREST

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CHAMPIONS for CHANGE
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Education, Diet, and Environmental Factors Influence Sugar-Sweetened Beverage Consumption Among California Children, Teens, and Adults

Angie J. Keihner, Amanda M. Linares, Carolyn D. Rider, Sharon Sugerman, Patrick R. Mitchell, and Mark Hudes

Summary

In California, approximately half of children, teens, and adults drink at least one serving of sugar-sweetened beverages (SSB) daily. This brief highlights the associations between SSB intake and demographic and socioeconomic factors; consumption of healthy and less healthy foods; health behaviors; psychosocial factors; and the home, work, and school environments. The California Department of Public Health's *Network for a Healthy California*, in partnership with the Public Health Institute and other organizations and in conjunction with the California Obesity Prevention Plan, supports the prioritization of public health efforts that aim to promote good nutrition, physically active lifestyles, and a healthy weight among low-income California families.

Background

Consumption of SSB promotes excess calorie intake with little to no nutritional value added.[1] In fact, SSB account for 22 percent of the empty calories (from solid fats and added sugars) consumed by children and teens.[2] Recent reviews provide compelling evidence that the consumption of SSB has contributed to the obesity epidemic in children and adults.[3, 4] Adults who drink one or more sodas per day are 27 percent more likely to be overweight than those drinking less.[5] In addition, evidence shows that over the past three decades, total calorie intake of children (2-18 years) has increased by approximately 184 calories per day.

The portion sizes of SSB increased simultaneously with the calories consumed during the meals and snacks including them.[6] The percentage of calories from SSB for a respective meal or snack also increased, providing evidence that SSB were directly related to the extra calories eaten at those times.[6] With a body of research pointing to the relationship between overweight, obesity and SSB intake, additional investigation into which demographic, socioeconomic, dietary, psychosocial, and environmental factors contribute to drinking SSB is vital for developing effective public health efforts.

Over the past decade, the passage of statewide legislation has banned the sale of sodas during school hours and mandated increased access to free drinking water during school meal times in all California public schools. These policy actions support the broader public health efforts needed to reduce SSB intake in California by making the healthy choice the easy choice. Key policy actions from 2001 through 2011 are highlighted below.

This research brief was developed by the California Department of Public Health's *Network for a Healthy California* to examine the risk factors for SSB consumption among children (9-11 years), teens (12-17 years), and adults (18 years and older) in California. In this analysis, SSB include sugary drinks such as regular soda, sweetened fruit drinks, flavored and sweetened bottled water or tea, and sports drinks; it excludes diet soda and flavored milks. It uses data from the *California Children's Healthy Eating and Exercise Practices Survey* (*CalCHEEPS*), the *California Teen Eating, Exercise, and Nutrition Survey* (*CalTEENS*), and the *California Dietary Practices Survey* (*CDPS*). For a full description of these surveys, see the Data Sources and Methods section at the end of this brief.

Key California Policy Actions and Dates

2001

- SB 19: Bans sale of food and beverages not meeting nutritional standards in elementary schools. Allows carbonated beverage sales in middle schools after the end of the last lunch period. Authorized study of nutritional standards in ten high schools and middle schools. Passed in 2001 but never implemented.

2003-2004

- SB 677: Bans sale of beverages not meeting nutritional standards in elementary, middle, and junior high schools. Passed in 2003. Became effective in 2004.

2005-2009

- Governor's Summit on Health, Nutrition, and Obesity held September 15, 2005.
- SB 281: Establishes the California Fresh Start Program, which provides an additional $.10 per meal for fruits and vegetables. Passed and immediately became effective in 2005.
- SB 12: Bans sale of food not meeting nutritional standards in public schools, including high schools. Passed in 2005. Became effective in 2007.
- SB 965: Bans sale of beverages not meeting nutritional standards in public schools, including high schools. Passed in 2005. Became effective in 2009.
- SB 441: Requires that at least 35 percent of food choices and one-third of beverage choices in vending machines on state property adhere to accepted nutritional guidelines. Passed in 2008. Became effective in 2011.
- AB 2084: Establishes standards for beverages served to children in California's licensed child care facilities and homes. Passed in 2010. Became effective in 2012

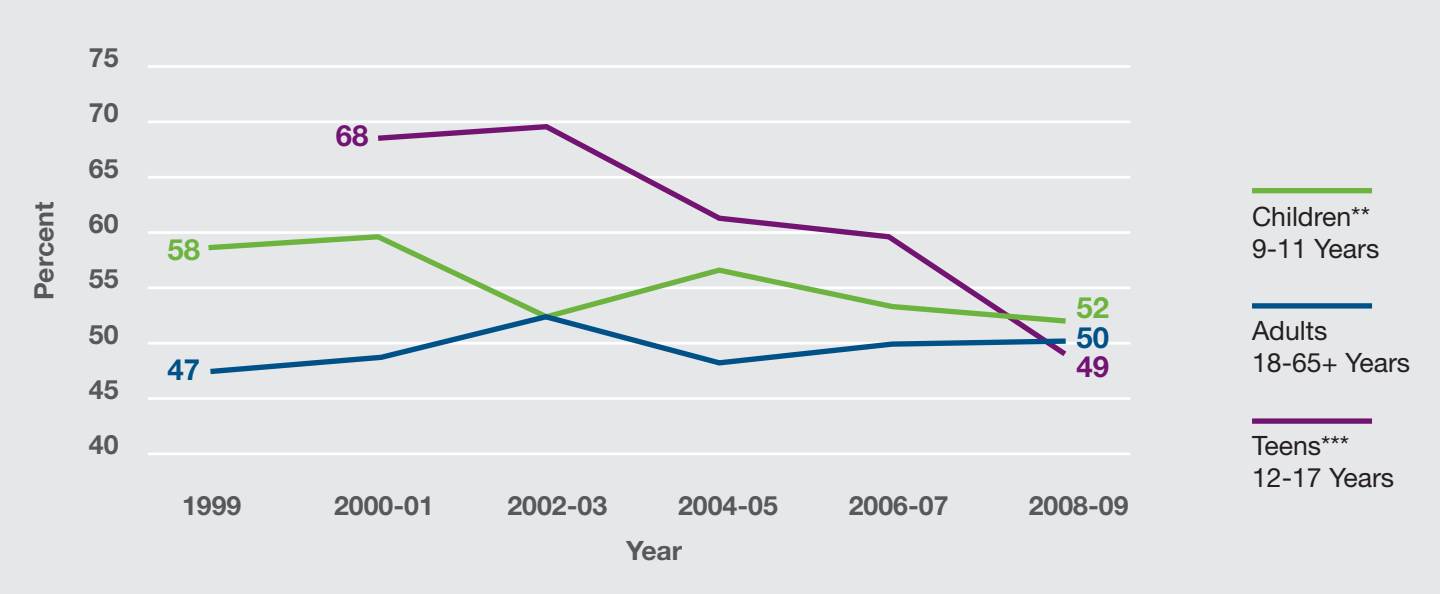
2010-2011

- SB 1413: Requires school districts to provide access to free, fresh drinking water during meal times in school food service areas. Passed in 2010. Became effective in 2011.

Sugar-Sweetened Beverage Intake in California

In 2008 and 2009, Californians averaged about a serving[a] of SSB per day (0.8 to 1.1 servings). Half of those surveyed reported drinking SSB on a typical day. Trends across age groups over the past ten years show significant decreases in the percent of children and teens who reported drinking SSB on an average day (Figure 1).

Figure 1. Consumption of Any Sugar-Sweetened Beverages Among Californians from 1999 to 2009



Source: 1999-2009 CalCHEEPS, 2000-2008 CalTEENS, and 1999-2009 CDPS.
*Notes: ** p<.01, *** p<.001. "Any" sugar-sweetened beverages includes half a serving or more.*

Risk Factors for Drinking Sugar-Sweetened Beverages

The findings presented in this research brief focus on the significant relationships identified between demographic, socioeconomic, dietary, psychosocial, and environmental factors and the consumption of SSB in 2006 and 2007. This analysis determined the unique contribution of each factor controlling for all of the other variables examined. The complete set of variables tested for each survey, including non-significant results, is provided in Appendices 1-3. The final regression results are presented in Appendices 4-7.

Demographic and Socioeconomic

Four demographic and socioeconomic risk factors were identified among children, teens, and adults in California: gender, age, race/ethnicity, and education level (Table 1).

Males — Adult and teenage males drank over one-third of a serving more SSB than females on a typical day.

Teens, 14 to 15 Years — Age was associated with daily SSB intake, but only among teens, such that 14- to 15-year-old teens reported drinking one-quarter of a serving more SSB than 12-13 year olds.

Minority Children — Latino and African American children drank over one-third of a serving more SSB per day compared to White children.

Lower Education — As parent education level[b] decreased, children drank more SSB. Children whose parents had a

[a] *A serving was defined as a single glass, can, or bottle of SSB. Serving size was not collected.*
[b] *Parent education included three categories: a high school education or less for both parents, one parent attended college, and both parents attended college.*

high school education or less drank nearly one-quarter of a serving more SSB than those with one parent attending college and just under half of a serving more SSB than those whose parents both had some college or higher education. Adults with less than a high school education drank almost one-third of a serving more SSB than those with some college education and nearly half a serving more than those with a college education.

Although significant relationships existed between household poverty status and SSB intake, the association did not remain significant in the regression analysis among children, teens, or adults (Table 1).

Table 1. Demographic and Socioeconomic Factors Related to Sugar-Sweetened Beverage Intake

Factor *(compared to)*	**Children**[‡] (servings)	**Teens** (servings)	**Adults** (servings)
Gender *(Females)*	ns	Males (0.49)***	Males (0.35)***
Age *(12-13 Years)*	ns	14-15 Years (0.24)* 16-17 Years (ns)	ns
Race/Ethnicity *(White)*	Latino (0.38)*** Black (0.42)* Asian/Other (ns)	ns	ns
Education Level *(compared to)*	**Parent Education** *(No College)* Some College: One Parent (-0.22)* Two Parents (-0.43)***	na	**Adult Education** *(Not High School Grad)* High School Grad (ns) Some College (-0.31)* College Grad (-0.44)**
Household Poverty Status	ns	ns	ns

*Notes: * p<.05, ** p<.01, *** p<.001; ns = not significant.*
na = question was not asked on the survey.
[‡] Results from the diary sample are displayed when the same factors exist in both the diary and phone regression models.

Foods and Beverages

In children, teens, and adults, intake of foods and beverages, both healthy and less healthy, showed strong relationships with SSB consumption (Tables 2 and 3).

Fruits and Vegetables — In children, eating vegetables was linked to lower SSB consumption. However, for every serving of fried vegetables[c] reported, there was nearly one-third of a serving more SSB consumed. While vegetables did not appear in the final adult model, adults who ate fruit drank slightly less SSB. No associations between SSB and fruits or vegetables were observed in teens.

Milk and Water — Contrary to expectations, children's milk[d] consumption was associated with higher SSB intake, with children drinking one-tenth of a serving more SSB for every serving of milk reported (Table 3). Milk consumption included flavored milks and milkshakes which may have contributed to the significant relationship between drinking milk and SSB. In contrast, water consumption was related to slightly lower SSB consumption in teens (Table 2).

High Calorie, Low Nutrient Foods — Children, teens, and adults all showed multiple positive associations between drinking SSB and eating foods such as fried foods, desserts, pastries, sweets, candy, and fast food (Table 3).

- **Candy and Added Sugar Foods** — Teens who ate candy drank one-fifth of a serving more SSB. Children and adults

[c] French fries made up the majority of the fried vegetables reported.
[d] Milk includes all types of milk (whole, 2%, 1%, and fat-free), flavored milk, and milkshakes.

who ate sweets like desserts, ice cream, and candy drank more SSB, and adults who ate breakfast pastries drank nearly one-third of a serving more SSB.

- **Chips and Fried Foods**[e] — Chips and fried foods, French fries, and deep-fried food were each independently associated with SSB consumption in children, teens, and adults respectively. For every serving of chips and fried vegetables reported, children drank about one-fifth to one-third of a serving more SSB. Teens who reported eating French fries drank three-fifths of a serving more SSB than teens who reported not eating any French fries. Adult deep-fried food consumption was linked to nearly one-third of a serving higher SSB intake and though only marginally significant, adult chip and fried snack food consumption was also associated with higher SSB consumption.

- **Fast Food** — Fast food consumption showed a clear gradient toward higher SSB intake in both teens and adults. Teens who ate fast food drank three-fifths of a serving more SSB and adults drank just under half a serving more.

Attitudes and Health Behaviors

In addition to dietary intake, several health behaviors and psychosocial factors surrounding health behavior were associated with SSB consumption in children, teens, and adults.

Parent and Teacher Behavior — The children's analysis revealed relationships between SSB consumption in children and the behavior of adults around them. Children whose parents ate high-fat foods reported that they drank a tenth of a serving more SSB (0.11 serving, p=.05). In addition, children who indicated that their teachers used high calorie, low nutrient "treats" as student rewards reported more than a quarter of a serving higher SSB intake (0.25 serving, p<.05).

Teen Knowledge and Attitudes — Teens who said that they know how to select healthy items from a menu reported almost one-third of a serving lower mean SSB consumption (-0.31 serving, p<.01), and teens who said that they "feel guilty" for not eating healthy reported drinking over one-quarter of a serving less SSB (-0.27 serving, p<.01).

Table 2: Foods Associated with Lower Sugar-Sweetened Beverage Intake

	Children[‡] (servings)	Teens (servings)	Adults (servings)
Vegetables	(-0.08)*	ns	ns
Fruit	ns	ns	(-0.05)*
100% Fruit Juice	(-0.16)~	ns	ns
Water	na	(-0.05)*	na

*Notes: * p<.05; ~ p=.052 (marginal); ns = not significant.*
na = question was not asked on the survey.
‡ Results from the diary sample are displayed when the same factors exist in both the diary and phone regression models.

Table 3. Foods Associated with Higher Sugar-Sweetened Beverage Intake

	Children[‡] (servings)	Teens (servings)	Adults (servings)
Milk	(0.11)**	ns	ns
Desserts, Pastries, & Candy	(0.15)***	Candy (0.21)* Dessert (ns)	Pastry (0.29)* Dessert (0.19)*
Chips & Fried Foods	(0.20)***	ns	Deep-Fried Food (0.29)* Fried Snack Food (0.21)~
French Fries & Fried Vegetables	(0.32)**	French Fries[†] (0.59)***	na
Fast Food	ns	(0.61)***	(0.5)*

*Notes: * p<.05, ** p<.01, *** p<.001; ~ p=.056 (marginal); ns = not significant.*
na = question was not asked on the survey.
[†] A subgroup of the teen sample was not asked the question about eating French fries. This group is not displayed but was included in the analysis in order to allow examination of this variable.
[‡] Results from the diary sample are displayed when the same factors exist in both the diary and phone regression models.

[e] Fried foods include pork rinds, cheese puffs, chicken nuggets, fried chicken, fried shrimp, and onion rings, along with snack food self-identified as fried.

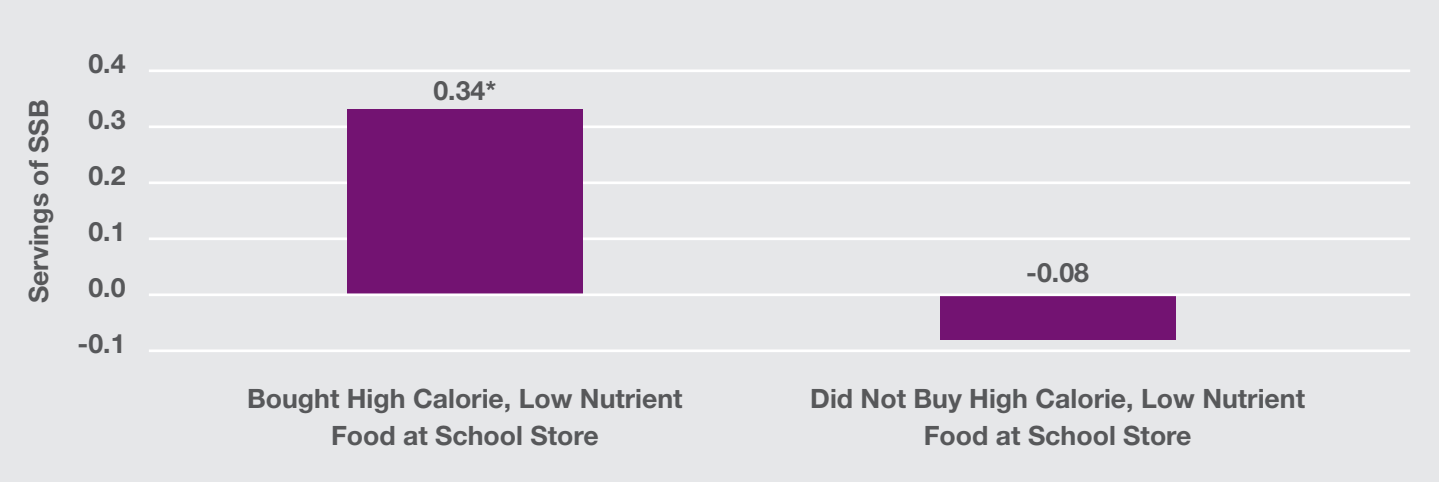
Health Risk Behaviors — Among adults, several less desirable health risk behaviors clustered together. Smoking status and time spent watching television were both positively associated with SSB intake. Adults who smoked reported drinking nearly half a serving more SSB than non-smokers (0.47 serving, p<.001). Compared to adults who watched 1.0 hour of television daily, adults who watched 2.7 hours a day reported drinking nearly a tenth of a serving more SSB (0.07 serving, p<.01).

School, Work, and Home Environments

School — Children and teens spend much of their day at school, often eating one or more meals each day on school grounds; therefore, authors examined the school food environment for associations with SSB intake. As mentioned above, teachers' use of "treats" as student rewards is associated with a quarter of a serving greater SSB intake in 9- to 11-year-old children. Among teens, a complex relationship between SSB consumption and student purchasing at school stores emerged (Figure 2). Teens who reported having a store at school that sells any of a variety of high calorie, low nutrient (HCLN) foods or beverages were asked whether they had purchased any of these foods or beverages from their school store the previous day. Teens who had purchased these items reported one-third of a serving higher intake of SSB than those attending a school without a store selling HCLN items. Students who had a school store selling HCLN foods, but did not purchase these items from it, did not differ from students attending a school with no such store.

Work — Just as children and teens spend a substantial part of their day in school, many adults work outside of the home (45% of *CDPS* respondents) and purchase meals or snacks at or near their worksites. Based on self-identified employment status, adult survey respondents were asked several questions relating to their workplace environment. Compared to the 55 percent of respondents who worked at home, were retired, not employed, or students, respondents who indicated that there were vending machines at their worksite drank two-fifths of a serving more SSB (Figure 3). Working adults with no vending machines at work drank about the same amount of SSB as adults not working outside the home.

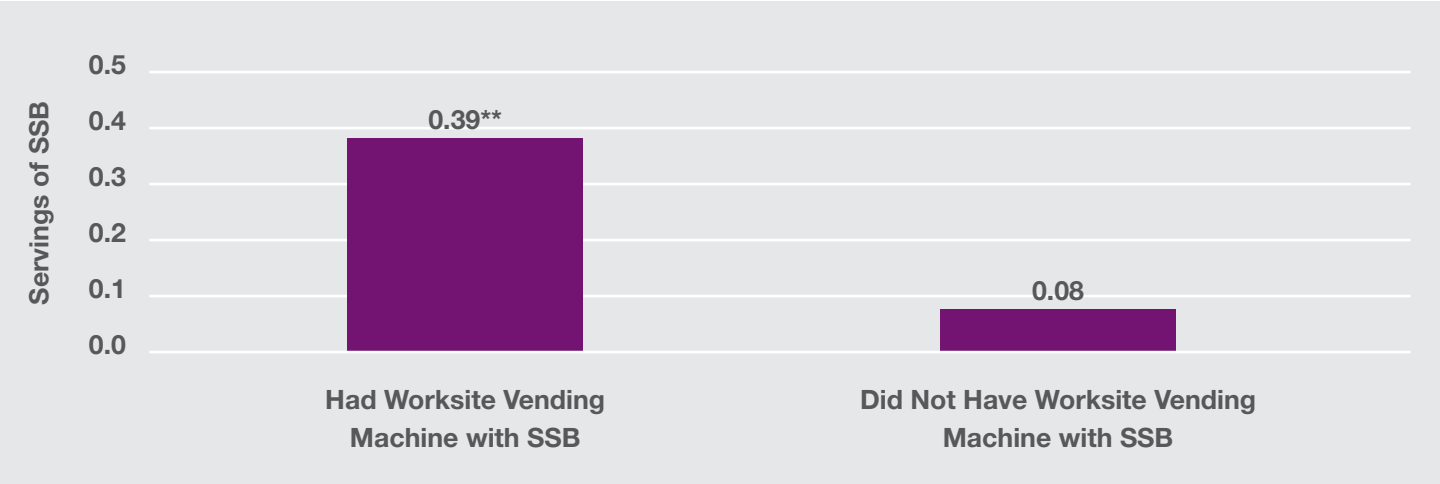
Figure 2. Teens' Purchases at School Stores that Sell High Calorie, Low Nutrient Foods Are Associated with SSB Intake



Source: 2006 CalTEENS.
*Notes: * p<.05. All serving differences and significance levels reported are in comparison to the reference group: teens attending schools without a store that sells specific high calorie, low nutrient foods. One-quarter (24%) of the teens surveyed were not currently attending school at the time of interview (e.g., due to school breaks). This group is not displayed, but was included in the analysis (0.04 serving).*

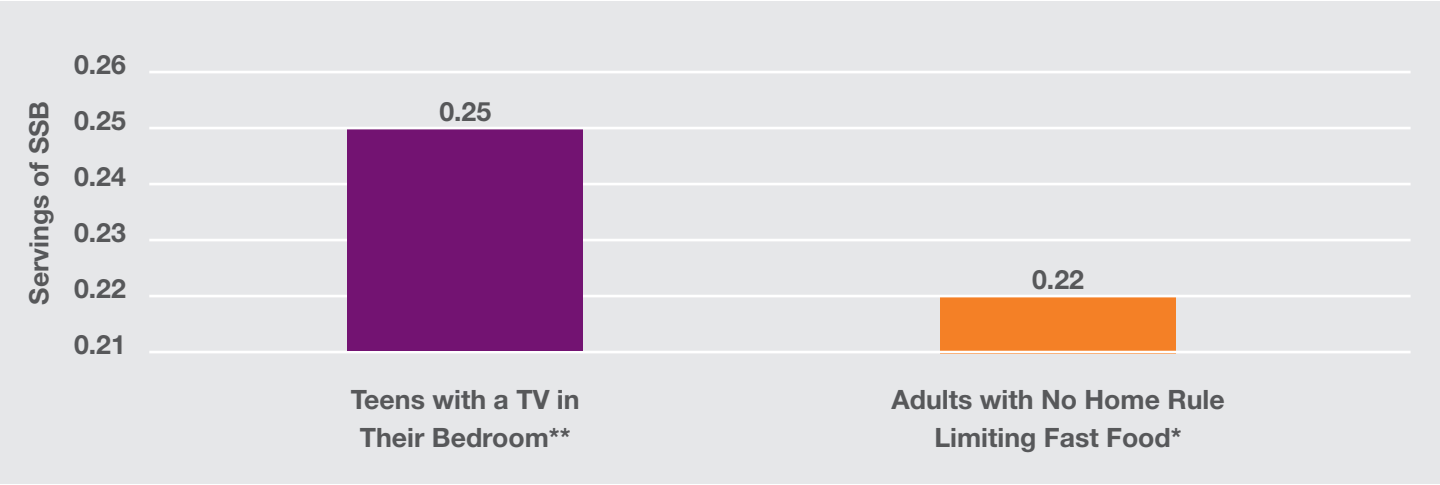
Home — Factors in the home environment were associated with how much SSB both teens and adults drank (Figure 4). Teens with a television in the bedroom drank a quarter of a serving more SSB than teens with no television in their room. Adults with a family or household rule restricting how often they ate fast food drank more than a fifth of a serving less SSB than adults with no such family rule.

Figure 3. SSB Vending Machines in the Worksite Are Associated with SSB Intake



Source: 2007 CDPS.
*Notes: ** p<.01. All serving differences and significance levels reported are in comparison to the reference group: adults who worked from home, were retired, not employed, or students.*

Figure 4. Factors in the Home Environment Are Associated with Higher SSB Intake



Source: 2006 CalTEENS, 2007 CDPS.
*Notes: * p<.05, **p<.01.*

Summary and Conclusions

With the goal of informing public health efforts to reduce the negative impact of SSB consumption on obesity, this research has identified several socioeconomic, psychosocial, and environmental risk factors for higher SSB intake among Californians. Although any individual variable may have only a small association with SSB intake, when all of the variables discussed in this brief were considered as a whole, they explained over one-fifth of children's (23%) and teens' (21%) SSB intake, and nearly one-sixth of the consumption in adults (15%).

Demographic and socioeconomic results indicate that male gender and low education status (self or parent) are risk factors for higher SSB intake. Although gender and educational attainment are not modifiable risk behaviors, they provide clear direction for designing health promotion initiatives that reduce SSB consumption.

- These findings point to the importance of targeted interventions that test and incorporate specific messaging and strategies for boys and their parents, beginning in childhood before their dietary practices deteriorate entering adolescence, and to shape their health priorities as parents.
- For adults, particularly parents, with a high school education or less, careful consideration of literacy level and improved access to information will help maximize the effectiveness of nutrition education campaigns. This emphasis should also apply to language and concepts used in media messaging.

Evidence shows that over the past three decades, total calorie intake of children (2-18 years) has increased by approximately 184 calories per day. Portion sizes of SSB increased simultaneously with increased calorie content of the meal or snack with which it was eaten. Results from the regression analysis exploring foods and beverages, both healthy and less healthy, indicate multiple links with SSB consumption. Most relationships were in the expected direction: consuming healthy foods was related to drinking less SSB, and consuming less healthy foods clustered together with drinking more SSB. In line with these findings, the *California Obesity Prevention Plan* (*COPP*) and the 2010 *Dietary Guidelines for Americans* (*DGA*) provide several key strategies to prioritize in public health efforts that aim to support good nutrition and promote healthy weight.[7,8] These include:

- Decreasing consumption of SSB;
- Choosing water, fat-free milk, 100% fruit juice, or unsweetened tea and coffee;
- Increasing fruit and vegetable intake;
- Decreasing consumption of high energy-dense foods by eating fewer sweets, French fries, and other fried foods;
- Cooking and eating more meals at home instead of eating out, and choosing healthy options when dining out.

In this study, risk factors for higher SSB intake also included more screen time and having a television in one's bedroom. This supports the finding that more screen time is associated with less health dietary behavior.[9] Strong evidence also shows that more screen time, particularly television viewing, is associated with overweight and obesity across the lifespan.[10-12] In addition, children with televisions in the rooms where they sleep have higher BMIs than those without.[13]

- These findings support the *COPP* and *DGA* recommendation to limit screen time.
- Parent education about the obesity risk associated with televisions in bedrooms is another strategy.[7]
- Public health efforts should promote desirable and fun physically active alternatives to screen time, which may have the added health benefits of increasing physical activity.[14]

Results linking psychosocial and environmental risk factors in schools and worksites with SSB intake point to the importance of school, worksite, and community wellness efforts. There is a critical need for public health promotion to ensure the availability and consumption of water and healthy beverages; to limit access to SSB and less healthy foods; and to engage schools, worksites, and other community partners to be champions for these changes in their neighborhoods.

Public health wellness strategies to reduce SSB intake described in the *California Obesity Prevention Plan* include:

Support Healthy Lifestyle Behaviors Through Nutrition Education and New, Healthy Social Norms in Schools.

- Provide quality nutrition and health education meeting state standards to all schoolchildren in pre-K through grade 12;
- Establish and maintain a school health or wellness council that meets regularly and includes school staff, students, parents, and community partners;
- Market the school meal program and eliminate the marketing of unhealthy foods and beverages on school grounds.

Provide Access to Healthy Foods and Beverages and Limit Access to Unhealthy Foods and Beverages.

Schools and Community-Based Youth Organizations

- Provide free access to fresh drinking water in eating areas;
- Ensure that competitive foods and beverages are compliant with or exceed California school food and beverage standards and work toward the reduction or elimination of the sale of competitive foods and beverages;
- Market and sell only healthy foods and beverages to children and youth at community, faith-based, and youth organizations;
- Leverage Farm-to-School programs and the California School Garden Network to increase schoolchildren's access to fresh fruits and vegetables;
- Promote alternatives to foods and beverages offered in fundraisers, at celebrations, and used as incentives.

ReThink Your Drink
Healthy Beverage Campaign

- Grassroots, partnership-driven
- Healthy beverage social marketing
- Skills-based nutrition education
- Media and public relations
- Promotion of healthy communities

www.californiaprojectlean.org/ryd/what.html

Worksites and Communities

- Implement the California state vending law in state worksites and disseminate as a model workplace policy;
- Disseminate model workplace policies that have been successfully implemented in California and across the nation;
- Promote workplace policies addressing foods and beverages in the cafeteria, at meetings and events, and in vending machines;
- Partner with local growers to locate farmers' markets near worksites;
- Limit the availability and portion sizes of less healthy foods and beverages and increase healthy foods and beverages at sports, movie, and other entertainment venues.

Local Government

- Implement local ordinances to restrict mobile vending of high calorie, low nutrient foods near schools and public playgrounds;
- Adopt land use and zoning policies that restrict fast food establishments and mini-markets near schools and public playgrounds;
- Identify planning and zoning opportunities to increase access to healthy foods and beverages through store placement in underserved communities and mobile vendors prioritizing healthy options.

The following school, worksite, and community wellness efforts can be implemented to support those outlined in the *COPP*:

- Prioritize health education in the classroom and cafeteria, specifically nutrition competencies;
- Use price incentives to promote the purchase of healthy food and beverage options;
- Utilize joint use agreements for sports, cooking or home economics classes, and play groups;
- Support community youth and adult sports leagues;
- Promote volunteerism, especially the clean-up and beautification of parks and other areas designated for community activities and play.

Californians can make healthy eating, physical activity, and other healthy lifestyle behaviors the foundation of daily living. In order to support this, comprehensive public health efforts are needed that promote a reduction in SSB intake by addressing price, access, and marketing where Californians live, work, and play.

Resources for Implementing Community Change

The following Web sites provide tangible resources to facilitate healthy changes in the local community, schools, and worksites:

Reducing Sugar-Sweetened Beverage Intake
www.californiaprojectlean.org/ryd/what.html
www.kickthecan.info
www.banpac.org/resources_sugar_savvy.htm
www.cdc.gov/healthyweight/healthy_eating/drinks.html
www.fewersugarydrinks.org
www.potterloveswater.com
www.cdph.ca.gov/programs/wicworks/Pages/WICRethinkYourDrink.aspx

California Obesity Prevention Program
www.cdph.ca.gov/programs/COPP/Pages/default.aspx

Making it Happen! School Nutrition Success Stories from the Centers for Disease Control and Prevention
www.cdc.gov/healthyyouth/mih/index.htm

Sugar-Sweetened Beverage Model Policies
www.publichealthadvocacy.org/_PDFs/beverage_policiesLocalPolicies_WaterSoda_Nov2010.pdf
www.publichealthadvocacy.org/_PDFs/beverage_policies CABeveragePolicies_Cities_Counties.pdf

***Network* Worksite Program Fit Business Kit**
www.cdph.ca.gov/programs/cpns/Pages/WorksiteFitBusinessKit.aspx

California Project LEAN School, Parent, Promotora, and Youth Engagement
www.californiaprojectlean.org/doc.asp?id=20

***Network* Regional Physical Activity Resource Directories**
www.cdph.ca.gov/programs/cpns/Pages/RegionalNetworks.aspx

Network Fruit, Vegetable, and Physical Activity Toolbox for Community Educators
www.network-toolbox.net

Harvest of the Month
www.harvestofthemonth.com

USDA's MyPlate
www.choosemyplate.gov

Data Sources and Methods

CalCHEEPS is a self-administered, parent-assisted mail survey with a follow-up telephone interview for a subset of the mail survey respondents conducted in English. The mail survey consists of a two-day food and activity diary. The telephone interviews collect children's unassisted knowledge, attitudes, and beliefs about diet and exercise. In total, 823 children returned the diary in 2007, and 327 completed the telephone interview, with response rates of 22 percent and 44 percent, respectively. The data were weighted to reflect California households with children between the ages of 9 and 11 based on race/ethnicity, federal poverty level (FPL), and SNAP participation from the March 2006 Current Population Survey (U.S. Census Bureau).

CalTEENS and *CDPS* are random-digit-dial (RDD) and Medi-Cal list-assisted telephone interviews conducted in English and Spanish. The telephone interviews collect information from teens and adults regarding dietary intake, physical activity, weight status, and knowledge, attitudes, and beliefs about diet and exercise. In total, 1,225 teens and 1,468 adults completed the telephone interview in 2006 and 2007, respectively. Cooperation rates were 54 percent and 52 percent respectively for the adult RDD and Medi-Cal samples, and 59 percent and 43 percent for teens. The weighting procedure included standard RDD and population adjustments. The data were post-stratified to adjust for variability in sex, age, and race/ethnicity between the sample and the population. The California population data are from the 2000 United States Census (U.S. Census Bureau).

CalTEENS also included a callback study to collect a few additional variables. During the callback project, attempts were made to contact all *CalTEENS* participants; 294 participants (24%) were unable to be reached. The only variable used in this report from the callback study was teen intake of French fries.

This study used bivariate analyses to identify potential determinants of SSB intake among children, teens, and adults. Appendices 1-3 provide a complete list of the variables examined. Analyses of *CalCHEEPS* and *CDPS* were conducted using PASW Statistics 17.0 with the add-on regression module (SPSS Inc., 2009, Chicago, IL); *CalTEENS* was analyzed using SAS software Version 9.1 (SAS Institute Inc., 2002-2008, Cary, NC). SSB and milk intake were capped at 10 servings; sedentary and physical activity minutes were log transformed. Variables with a p-value $< .10$ were included in the regression analyses.

The regression analysis was conducted in two parts. First, the authors identified the primary risk factors from the independent variables italicized in Appendices 1-3. Least squares (OLS) regressions were produced using backwards stepwise techniques with mean servings of SSB as the dependent variable. Variables were included in the models with a p-value $\leq .05$ and removed if they were $> .10$. Second, the primary risk factors identified in the first stepwise regressions were simultaneously entered into OLS regressions controlling for gender, age, and race/ethnicity. The final regression models provide the coefficients for mean servings of SSB adjusting for demographics. The regression results are presented in Appendices 4-7.

Limitations

CalCHEEPS utilizes a market research panel, not random sampling, which limits the external validity of the instrument. It is a complex and lengthy survey, and is only conducted in English. A limitation of the *CDPS* and *CalTEENS* is the inability of a single 24-hour recall to directly estimate the distribution of usual intakes in a population due to within-person variance. With all three instruments there is both a self-report bias and a social desirability bias.

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Appendix 1: List of All *CalCHEEPS* Variables Tested Using Bivariate Analysis, by Instrument

Dependent Variable	Mail Survey (n)	Phone Survey (n)
How many servings of regular soda, sweetened fruit drinks, flavored/sweetened bottled water/tea, and sports drinks did you drink? (mean servings)	823	327
Independent Variables		
Demographic and Socioeconomic Factors		
Gender (boy and girl)	***823***	327
Age (mean years)	823	327
Race/Ethnicity (White, Latino, African American, and Asian/Other)	***823***	327
Household Poverty Status (FS participant, ≤ 130% FPL–no FS, > 130% to ≤ 185% FPL, and > 185% FPL)	823	***327***
Parent Education (≤ high school for both parents [0], > high school for one parent [1], and > high school for both parents [2])	***821***	***327***
Dietary Intake and Practices		
How many servings of fruit did you eat? (mean servings)	***823***	327
How many servings of 100% fruit juice did you drink? (mean servings)	823	***327***
How many servings of vegetables (without fried) did you eat? (mean servings)	***823***	***327***
How many servings of fried vegetables did you eat? (mean servings)[1]	***823***	***327***
How many servings of milk did you drink? (mean servings)	***823***	***327***
How many servings of sweets did you eat? (mean servings)	***823***	***327***
How many servings of chips and other fried foods did you eat? (mean servings)	***823***	***327***
Where did you get the food for (meal/snack)? Marked fast food restaurant.[3]	***823***	***327***
Where did you get the food for breakfast? Marked school breakfast.[4]	***823***	327
Where did you get the food for lunch? Marked school lunch.[4]	823	327
Physical Activity and Screen Time		
How many minutes did you spend exercising or being physically active? (mean minutes)	823	***327***
How many minutes did you spend watching TV/videos/DVD's or playing computer/video games for fun (i.e. screen time)? (mean minutes)	***821***	326
Behavioral Capability		
During this school year, have you had any lessons about food, nutrition, and your health?[4]	823	***327****
Food Modeling[2]		
Your parents eat high-fat foods like French fries, chips, or desserts.		***325***
Your friends usually eat healthy foods.		322
Family Norms[3]		
Thinking of yesterday, did your family sit down and eat a meal together?		327
Family Rules and Home Environment		
Your parents limit the amount of chips, soda, or sweets you can eat each day?[2]		325
Do your parents limit the amount of time you spend watching TV or playing video games to less than two hours a day?[3]		323
Do you have a television in your bedroom?[3]		326
School Environment		
Does your school have a soda vending machine that students can use?[3]		325
Does your school cafeteria have a salad bar?[3]		318
Does your school cafeteria usually serve students fast food made by restaurants like McDonald's, Burger King, Taco Bell, or Pizza Hut?[3]		319
Does your teacher reward students by giving out treats like candy, cookies, soda, or chips?[3]		***323***
Does your school have sodas, sports drinks, cookies, chips, or candy that students can buy after school?[3]		323
Does your school cafeteria serve at least two different fresh fruits every day at lunch?[3]		316
Did you get to taste any fruits or vegetables in the classroom this year?[4]		319

Gender, age, race/ethnicity and household poverty status were included in the stepwise regression model as statistical controls.

[1] This primarily includes French fries and other fried potatoes.

[2] Response options: disagree a lot [1], disagree a little [2], agree a little [3], and agree a lot [4].

[3] Response options: yes [1] and no [0].

[4] Response options: yes [1] and no [2].

** Marginal significance observed at p<.10.*

Italicized variables had significant bivariate relationships with SSB intake and were included in the stepwise regression models. Fruit, juice, and vegetables were included in the model regardless of the bivariate significance.

Appendix 2: List of All *CalTEENS* Variables Tested Using Bivariate Analysis

Dependent Variable	Phone Survey (n)
Yesterday how many servings of regular soda (cola, lemon-lime) or sweetened beverage like Snapple, Kool-Aid, Arizona, Red Bull, Rockstar, or Sobe did you drink? (mean servings)	1,221
Independent Variables	
Gender (male and female)	***1,221***
Age (12-13, 14-15, and 16-17)	1,221
Race/Ethnicity (White, Latino, African American, and Asian/Other)	1,221
Household Poverty Status (FS participant, ≤ 130% FPL–no FS, > 130% to ≤ 185% FPL, and > 185% FPL)	1,140
About how much money do you have each week to spend on yourself any way you want to?	***1,215***
Dietary Intake	
Servings of vegetables eaten yesterday	1,221
Servings of fruit eaten yesterday	***1,221***
Servings of 100% juice drunk yesterday	1,221
Yesterday, did you eat or drink anything for breakfast?	***1,220***
Yesterday, how many servings of milk did you drink, including chocolate milk, fast food milkshakes, milk on cereal, or large coffee drinks such as a mocha or latté?	***1,221***
Yesterday, how many 20 ounce bottles of water did you drink?	***1,216***
Yesterday, how many times did you eat a meal or snack from a fast food restaurant like McDonalds, Taco Bell, Jack-in-the-Box, Pizza Hut, KFC, or Subway?	***1,215***
In a typical week, how many times do you eat a meal or snack from a fast food restaurant?[2]	***1,219***
How many servings of French fries did you eat yesterday?[1,3]	***1,225***
Yesterday did you eat any sweet snacks like cake, pie, cookies, or brownies?[1]	***1,223***
Yesterday did you eat any candy bars or packages of candy?[1]	***1,224***
Physical Activity and Sedentary Time	
Physical activity for 60 minutes or more yesterday	1,221
Yesterday, how many minutes or hours did you watch television or videos or play video or computer games that were for fun?	***1,218***
Do you have a television set in your bedroom?	***1,219***
Health Behaviors and Outcomes	
Think about the last 30 days. On how many of these days did you smoke?[1]	***1,225***
Are you dieting to lose weight now?[1]	464
How would you describe your health? (poor, fair, good, very good, or excellent)	1,220
Psychosocial & Cognitive Factors	
Do you feel guilty on days when you haven't eaten healthy food?[1]	***1,212***
Do you know how to pick out healthy foods from menus?[1]	***1,216***
In the last year, have you taken a class or course at school in which the health effects of good eating habits were discussed?[1]	1,192
Home Environment	
Do your parents or adults you live with limit how much soda you drink at home?[1]	***1,213***
Do you usually eat dinner with your family or the people you live with?[1]	***1,214***
Do your parents or the adults you live with notice when you haven't eaten healthy foods?[1]	***1,208***
School Environment	
Does your school serve food from fast food restaurants like Burger King, McDonald's or Taco Bell every day?[1]	984
Does your school have a soda vending machine that students can use?[1,2]	991
Does your school have a student store where chips, cookies, candy, or soda are sold?[1]	991
Yesterday (last day of school), did you buy chips, cookies, candy, or soda from the student store?[2]	***1,101***
School Meal Participation	
Did you eat a complete school breakfast yesterday?[1]	483
Did you eat a complete school lunch yesterday?[1]	361
During the school year, approx. how many times a week do you usually get a complete school breakfast?	991
During the school year, approx. how many times a week do you usually get a complete school lunch?	991

Gender, age, race/ethnicity and household poverty status were included in the stepwise regression model as statistical controls.

[1] Response options were coded for analysis as: Yes [1] and No [2].

[2] Variable had a significant bivariate relationship with SSB intake but was excluded from the stepwise regression model due to small sample size or overlap with another variable included in the model.

[3] Third category of respondents with missing data was created in order to allow examination of this variable in the analysis.

Italicized variables had significant bivariate relationships with SSB intake and were included in the stepwise regression models. Fruit, juice, and vegetables were included in the model regardless of the bivariate significance.

Appendix 3: List of All *CDPS* Variables Tested Using Bivariate Analysis

Dependent Variable	Phone Survey (n)
Yesterday, how many cans or glasses of regular carbonated soft drinks such as cola, lemon lime, or sweetened non-carbonated beverages such as Gatorade, Snapple, Sunny Delight, or Kool-Aid did you drink? (mean servings)	1,468
Independent Variables	
Demographic and Socioeconomic Factors	
Gender (male and female)	***1,468***
Age (18-24, 25-34, 35-50, 51-64, and 65+)	***1,467***
Race/Ethnicity (White, Latino, African American, and Asian/Other)	***1,465***
Household Poverty Status (FS participant, ≤ 130% FPL–no FS, > 130% to ≤ 185% FPL, and > 185% FPL)	***1,396***
Education (< high school, high school graduate, some college, and college graduate)	***1,464***
Dietary Intake	
Yesterday, how many servings of fruit did you eat? (mean servings)	***1,468***
Yesterday, how many servings of 100% juice did you drink? (mean servings)	1,468
Yesterday, how many servings of vegetables did you eat? (mean servings)	***1,468***
Yesterday, did you drink any milk or drinks made with milk, such as chocolate milk, fast food milkshake, chai, latte, or have milk on cereal?[1]	***1,467***
Yesterday, did you eat any breakfast pastries like doughnuts, danishes, sweet rolls, muffins, croissants, or pop tarts?[1]	***1,468***
Yesterday, did you eat any deep-fried foods like French fries, fried chicken, chicken nuggets, fried fish, fried shrimp, or onion rings?[1]	***1,468***
Yesterday, did you eat any potato chips, corn chips, cheese puffs, pork rinds, or other fried snack foods?[1]	***1,466***
Yesterday, did you eat any desserts like cake, pie, brownies, ice cream or chocolate candy bars?[1]	***1,468***
Yesterday, how many of your meals or snacks came from a fast food restaurant?[1]	***1,466***
Physical Activity and Sedentary Time	
Met recommendation for being regularly physically active, 5 days per week for 30 min per day.[1]	1,409
How much time did you spend watching TV yesterday? (mean minutes)	***1,467***
Health Behaviors	
Think about the last 30 days. On how many of these days did you smoke cigarettes or other tobacco products?[1]	***1,443***
When you eat out do you look for or ask about calorie information for the menu items you choose?[1]	***1,468***
Weight	
Do you consider yourself to be overweight, underweight, or about average for your height?[2]	1,465
Are you presently trying to lose weight?[1]	1,468
Family Rules	
Does your family (Do you) limit the amount of junk food, such as chips, candy, soda, etc., in the house?[1]	***1,459***
Does your family (Do you) limit the number of times per week or per month you eat at fast food restaurants?[1]	***1,463***
Work Environment	
Does your worksite have vending machines for employees to access food or beverages?[3]	***1,455***
Are there restaurants, fast food places, delis, catering trucks, or markets within walking distance of your worksite?[1]	1,468

Gender, age, race/ethnicity and household poverty status were included in the stepwise regression model as statistical controls.

[1] Response options: Yes [1] and No [2].

[2] Response options: Overweight [1], Underweight [2], and About Average [3].

[3] Response option: Yes [1], No [2], and Not Employed [3].

Italicized variables had significant bivariate relationships with SSB intake and were included in the stepwise regression models. Fruit, juice, and vegetables were included in the model regardless of the bivariate significance.

Appendix 4: Risk Factors for Sugar-Sweetened Beverage Intake, *CalCHEEPS* Mail Survey

	Simultaneous OLS Regression (n = 819)		
	Coeff.		***(SE)***
Constant	*1.207*		*(.629)*
Explanatory Variables			
Gender	-.127	ns	(.083)
Age	-.039	ns	(.059)
Race/Ethnicity[1]		***	
White (reference)	ref		
Latino	.378	***	(.097)
African American	.437	*	(.186)
Asian/Other	.158	ns	(.129)
Household Poverty Status[1]		ns	
Parent Education[1]		**	
No College (reference)	ref		
Some College: 1 Parent	-.223	*	(.120)
Some College: 2 Parents	-.430	***	(.126)
Servings of Vegetables	-.076	*	(.035)
Servings of Fried Vegetables	.321	**	(.114)
Servings of Milk	.108	**	(.034)
Servings of Sweets	.153	***	(.031)
Servings of Chips and Other Fried Foods	.195	***	(.051)
Model Fit			
R-Square		.134***	

[1] Race/ethnicity, household poverty status, and parent education entered as blocks. The F test was used to obtain the p-values for the global tests of significance for each block in the model.
** p < .05, ** p < .01, *** p < .001; ns = not significant.*
OLS = ordinary least squares.
SE = standard error.

Appendix 5: Risk Factors for Sugar-Sweetened Beverage Intake, *CalCHEEPS* Phone Survey

	Simultaneous OLS Regression (n = 322)		
	Coeff.		***(SE)***
Constant	*1.075*		*(.947)*
Explanatory Variables			
Gender	-.016	ns	(.111)
Age	-.037	ns	(.085)
Race/Ethnicity[1]		ns	
Household Poverty Status[1]		ns	
Parent Education[1]		*	
No College (reference)	ref		
Some College: 1 Parent	-.421	*	(.174)
Some College: 2 Parents	-.474	*	(.183)
Servings of 100% Fruit Juice	-.160	p=.052	(.082)
Servings of Vegetables	-.097	*	(.045)
Servings of Sweets	.174	***	(.038)
Servings of Chips and Other Fried Foods	.204	**	(.070)
Teacher Rewards Students with Treats	.252	*	(.110)
Parents Eat High-Fat Foods	.107	p=.050	(.055)
Model Fit			
R-Square		.232***	

[1] Race/ethnicity, household poverty status, and parent education entered as blocks. The F test was used to obtain the p-values for the global tests of significance for each block in the model.
** p < .05, ** p < .01, *** p < .001; ns = not significant.*
OLS = ordinary least squares.
SE = standard error.

Appendix 6: Risk Factors for Sugar-Sweetened Beverage Intake, *CalTEENS*

	Simultaneous OLS Regression (n = 1,101)		
	Coeff.		***(SE)***
Constant	*.808*	**	*(.281)*
Explanatory Variables			
Gender (male)	.487	***	(.081)
Age[1]		*	
12-13 years (reference)	ref		
14-15 years	.242	*	(.098)
16-17 years	.090	ns	(.102)
Race/Ethnicity[1]		ns	
Household Poverty Status[1]		ns	
School Store Purchases of HCLN Foods/Beverages[1]		*	
Yes	.335	*	(.160)
No	-.079	ns	(.118)
Not currently attending school	.035	ns	(.129)
No school store (reference)	ref		
TV in the Bedroom	.251	**	(.087)
Knows How to Choose Healthy Menu Items	-.306	**	(.110)
Feels Guilty for Not Eating Healthy	-.270	**	(.082)
Water Consumption (20 oz bottles)	-.053	*	(.023)
Ate Fast Food	.607	***	(.076)
Ate Dessert	.166	ns	(.087)
Ate Candy	.211	*	(.097)
Ate French Fries[1]		***	
Yes	.586	***	(.124)
No (reference)	ref		
Missing information	.332	**	(.106)
Model Fit			
R-Square		.208***	

[1] Age, race/ethnicity, household poverty status, school store purchases of HCLN foods/beverages, and ate French fries entered as blocks. The F test was used to obtain the p-values for the global tests of significance for each block in the model.
** p < .05, ** p < .01, *** p < .001; ns = not significant.*
OLS = ordinary least squares.
SE = standard error.
HCLN = high calorie, low nutrient.

Appendix 7: Risk Factors for Sugar-Sweetened Beverage Intake, *CDPS*

	Simultaneous OLS Regression (n = 1,332)		
	Coeff.		***(SE)***
Constant	.980	***	(.245)
Explanatory Variables			
Gender	.346	***	(.095)
Age[1]		ns	
Race/Ethnicity[1]		ns	
Education[1]		**	
Less than High School (reference)	ref		
High School Graduate	-.004	ns	(.144)
Some College	-.312	*	(.151)
College Graduate	-.437	**	(.167)
Household Poverty Status[1]		ns	
Worksite Vending Machine		**	
Yes	.391	**	(.121)
No	.084	ns	(.121)
Other[2] (reference)	ref		
Ate Fast Food	.465	*	(.141)
Fast Food Rule	-.223	ns	(.111)
Hours of Television	.069	**	(.025)
Servings of Fruit	-.050	*	(.021)
Smoke	.468	***	(.110)
Ate Breakfast Pastry	.288	*	(.128)
Ate Deep-Fried Food	.293	*	(.122)
Ate Fried Snack Food	.214	p=.056	(.112)
Ate Dessert	.187	*	(.093)
Model Fit			
R-Square		.157***	

[1] Age, race/ethnicity, education, household poverty status, and worksite vending machine entered as blocks. The F test was used to obtain the p-values for the global tests of significance for each block in the model.
[2] Other refers to adults working at home, retired, students, and not employed for wages.
** p < .05, ** p < .01, *** p < .001; ns = not significant.*
OLS = ordinary least squares.
SE = standard error.

This material was produced by the California Department of Public Health's *Network for a Healthy California* with funding from USDA SNAP, known in California as CalFresh (formerly Food Stamps). These institutions are equal opportunity providers and employers. CalFresh provides assistance to low-income households and can help buy nutritious foods for better health. For CalFresh information, call 1-877-847-3663. For important nutrition information, visit www.cachampionsforchange.net.

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CALIFORNIA DEPARTMENT OF HEALTH CARE SERVICES AND CALIFORNIA DEPARTMENT OF PUBLIC HEALTH

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RESULTS FROM THE 2009 CALIFORNIA WOMEN'S HEALTH SURVEY

Consumption of Sugar-Sweetened Beverages Among California Women, 2009

California Department of Public Health
Cancer Control Branch
Network for a Healthy California
Public Health Institute

Consumption of soda and other sugar-sweetened beverages (SSBs) has been identified as a risk factor for obesity, metabolic syndrome, and type 2 diabetes.[1,2] In California, adults who reported drinking SSBs daily (62 percent) were 27 percent more likely to be overweight or obese than those who reported drinking no SSBs during the prior month.[1] Reducing consumption of SSBs is one of the six target areas of the Centers for Disease Control and Prevention's funded California Obesity Prevention Program.[3] It is also the focus of the California Department of Public Health's *Network for a Healthy California's Rethink Your Drink* social marketing campaign conducted in nine of the *Network's* 11 statewide regions.

These analyses were conducted with 4,333 women participating in the 2009 California Women's Health Survey who answered the question: *Over the last month (past 30 days), how many times per month, week, or day did you drink at least one 8-oz. glass of regular soda, fruit drink, or other sweet beverage like Kool-Aid, lemonade, Hi-C, cranberry juice drink, energy drink and sports drink? Include beverages you drank at all mealtimes and between meals, but do not include diet drinks.* Women were classified as high consumers of SSBs if they reported drinking at least one a day.

Women were also asked sociodemographic questions to classify their household income by ratio to the Federal Poverty Guidelines (FPG)[4] and to identify their participation in the Food Stamp Program (FSP).[5] They were asked the U.S. Department of Agriculture's standardized, six-item validated short form of the food security scale,[6] with responses categorized for these analyses as food secure[7] or not food secure. Self-reported height and weight were used to identify body mass index (BMI).[8] Additional questions established general health status, number of children in the household, educational level, age group, and race/ethnicity.

The relationship between high consumption of sweetened beverages and sociodemographic characteristics (poverty level/FSP participation, food security status, body weight category, general health status, education, age group, race/ethnicity, and children in the household) was examined using bivariate statistics and logistic regression. Responses were weighted in these analyses by age and race/ethnicity to reflect the 2000 California adult female population. All findings were statistically significant at $P < .001$ unless otherwise specified.

Nearly one quarter of California women (24.4 percent) reported consuming at least one daily soda or other sweetened beverage. A strong positive association was found between the consumption of SSBs and poverty-related variables of FSP participation, decreased ratio of income to the FPG, and food insecurity (Figure 1): Consumption of SSBs increased as these increased.

- FSP participants and low income women (< 130 percent of the FPG) reported significantly greater daily consumption of SSBs (41.9 percent and 33.7 percent, respectively) than women from higher income households (23.5

Public Health Message:
Low income California women are more likely than women in higher income groups to drink one or more sugar-sweetened beverage daily, as are younger women of child bearing age and those with less education. Strong messages that promote alternative healthy, lower calorie beverages, delivered in a creative, engaging media format could be a valuable addition to public health strategies for obesity prevention, for women and their children.

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percent for women with income > 130 percent - 185 percent of the FPG, and 18.7 percent for women with income > 185 percent of the FPG). Neither the low income and FSP groups differed statistically from one another nor did the two higher income groups.

- Food-insecure women were significantly more likely to report drinking at least one SSB per day (33.9 percent) than women who reported being food secure (20.9 percent).

Although the initial regression model included all eight sociodemographic characteristic variables that had significant bivariate relationships, only four remained significant and were included in the final model: education level, age group, race/ethnicity, and poverty level/FSP participation. After controlling for the other variables in the final model:

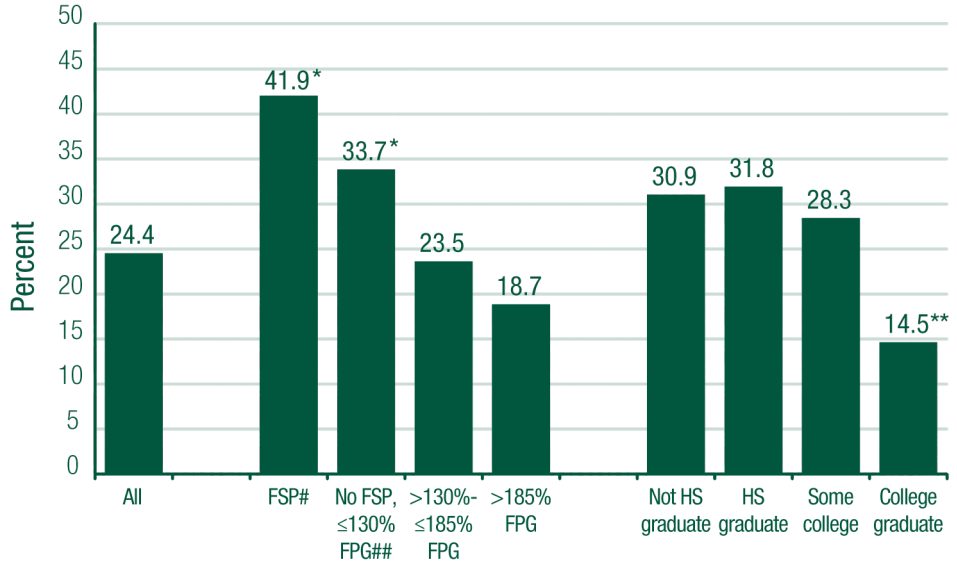
- Women who had not graduated from college were about twice more likely to drink SSBs daily than women who had graduated.

- Women ages 18 to 44 were 1.4 times more likely than women ages 45 and older to drink SSBs daily.

- Women from all other racial/ethnic groups were more likely than Hispanic women to drink SSBs daily: African American/Black women were 2.9 times more likely; White women were 1.3 times more likely; and Asian/Other women were 1.2 times more likely.

Figure 1

Sugar-Sweetened Beverage Consumption in California Women, by Food Stamp Participation, Income, and Education, 2009



* $P < .05$ between each < 130% Federal Poverty Guideline (FPG) group and each > 130% FPG group
** $P < .001$ between college graduate and each other educational level
\# Food Stamp Program participant
\## Not an FSP participant, but household income is at FSP qualifying cutpoint ≤ 130% FPG

Source: California Women's Health Survey, 2008-2009

However, other than Hispanics, there were no significant differences between the racial/ethnic groups.

- FSP participants and women from low income households (< 130 percent of the FPG) were 1.9 and 1.6 times more likely respectively to drink SSBs daily than women from higher income levels.

1 Babey SH, Jones M, Yu H, Goldstein H. Bubbling over: soda consumption and its link to obesity. UCLA Center for Health Policy Research and California Center for Public Health Advocacy. http://www.healthpolicy.ucla.edu/pubs/files/Soda%20PB%20FINAL%203-23-09.pdf. Published September 2009. Accessed October 12, 2010.

2 Malik VS, Popkin BM, Bray GA, Després JP, Willett WC, Hu FB. Sugar sweetened beverages and risk of metabolic syndrome and Type 2 diabetes: a meta-analysis. *Diabetes Care* 2010; 33(11):2477-2483.

3 California Obesity Prevention Program. California Department of Public Health Website. http://www.cdph.ca.gov/programs/COPP/Pages/default.aspx. Accessed October 12, 2010.

4 Percent of Federal Poverty Guidelines (FPG) is used, among other things, to help determine eligibility for public programs. The upper limit for income eligibility for the Food Stamp Program is 130 percent FPG.

5 The federal Food Stamp Program is now called the Supplemental Nutrition Assistance Program (SNAP), and the California program is called CalFresh.

6 Bickel G, Nord M, Price C, Hamilton W, Cook J. Guide to measuring food security, revised 2000. Alexandria, VA; Food and Nutrition Service, U.S. Dept. of Agriculture; 2000.

7 Food security is defined as having “access, at all times, to enough food for an active, healthy life.”

8 BMI - lower than 18.5 = underweight; BMI > 18.5 < 25 = healthy weight; BMI at least 25< 30 = overweight; BMI >30 = obese.

Submitted by: Sharon B. Sugerman, M.S., R.D., Patrick Mitchell, Dr.PH., and Barbara MkNelly, M.P.H., California Department of Public Health, Cancer Control Branch, *Network for a Healthy California*, (916) 449-5406, Sharon.Sugerman@cdph.ca.gov

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RESULTS FROM THE 2009 CALIFORNIA WOMEN'S HEALTH SURVEY

Perceived Effective Weight Control Strategies by Supplemental Nutrition Assistance Program Participation and Income Among California Women, 2009

California Department of Public Health
Cancer Control Branch
Network for a Healthy California

Weight loss is a health goal for many overweight and obese Americans, especially women. Nationally, women reported being nearly 1.5 times more likely than men to report trying to lose weight.[1] In California, about half of all women were overweight or obese in 2009, and low income women were significantly more likely to be so (55.6 percent vs. 45.2 percent, respectively).[2] The generally recommended strategy for weight loss is concurrent reduction of energy consumed and increased energy expended; yet only about one-third of Americans trying to lose weight report using this combination.[3-5] Increasing consumption of low energy-dense foods such as fruits and vegetables is another strategy promoted for weight loss and weight maintenance.[3]

Several California Department of Public Health programs have obesity prevention and chronic disease risk reduction as a goal of their work. For instance, the *Network for a Healthy California* mission includes increasing consumption of fruit and vegetables and daily physical activity. The *Network* provides nutrition education to Food Stamp Program[6] (FSP) recipients and other low income Californians whose household income is less than 185 percent of the Federal Poverty Guidelines (FPG). An analysis stratified by income examining perceived effective weight control strategies would be useful for informing program design.

These analyses were conducted with 4,226 women participating in the 2009 California Women's Health Survey who answered the open-ended question: *People use many strategies to lose weight and to keep the weight they have lost off. What is the (one) strategy you think is most effective in helping people to successfully lose weight or keep off the weight they have lost?* Women were also asked household size and income questions to classify their household income by ratio to the FPG and to identify their participation in the FSP, which has an upper income qualification limit of 130 percent FPG. Income related groups were categorized based on U.S. Department of Agriculture guidelines for participation in FSP nutrition education: FSP participants; non-FSP recipients with income at or below 130 percent of the FPG (income eligible women); women with income between 131 and 185 percent of the FPG (potentially eligible women); and non-eligible women from households with income greater than 185 percent of the FPG.

Responses to the weight control strategy question were categorized and close-coded. The relationship between FSP participation, household income, and perceived effective strategies for weight control was examined for statistical significance using bivariate analysis. *P* less than .05 was considered statistically significant. Responses were weighted in these analyses by age and race/ethnicity to reflect the 2000 California adult female population.

- Overall, three weight control strategies were most commonly reported: combining physical activity and dietary change (31.8 percent); being active with no mention of diet (28.8 percent); and restricting food intake (e.g., limiting

Public Health Message:
Less than one-third of California's low income women and one quarter of very low income women identified the recommended strategy for weight loss, pairing increased energy expenditure with reduced energy intake. Mandatory menu labeling can raise Californian women's awareness of the caloric implications of their food choices, while public health messaging can emphasize the importance of both calories consumed and energy spent. Environmental changes that foster energy output can be supportive in many settings.

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Perceived Effective Weight Control Strategies by Supplemental Nutrition Assistance Program Participation and Income Among California Women, 2009

California Department of Public Health
Cancer Control Branch
Network for a Healthy California

calories, reducing portion size) with no inclusion of physical activity (22.9 percent).

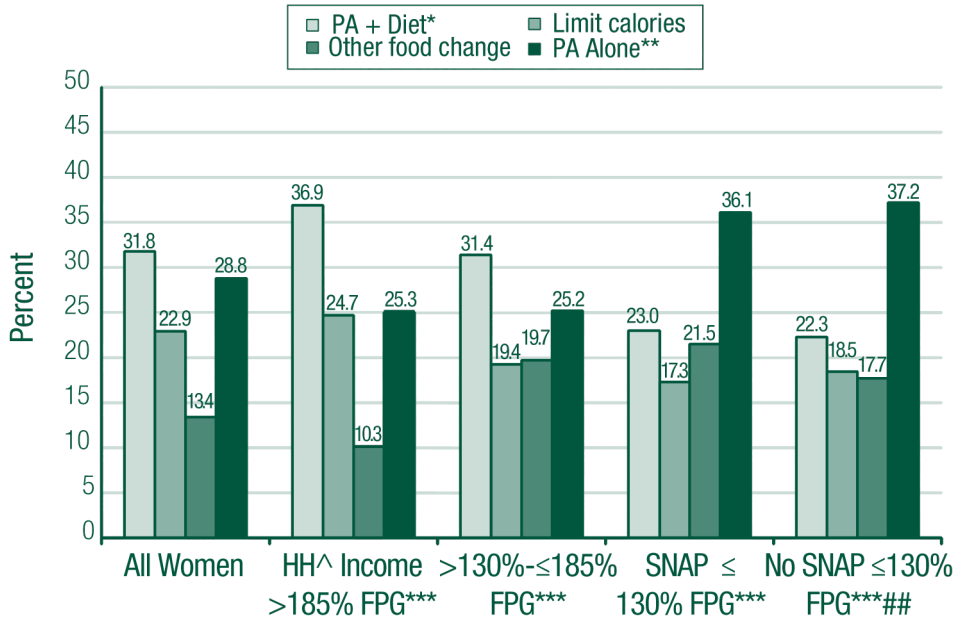
- Another 13.4 percent of women recommended changing food habits (e.g., eat "better" food, consume more fruits and vegetables, follow a vegetarian diet), but not limiting calories or serving sizes.

- A very small proportion, 3.2 percent, identified non-diet or physical activity strategies such as social support, willpower, medical intervention, drinking water, or other lifestyle changes.

- The two higher income groups of women were significantly more likely to report the recommended concurrent reduction of energy consumed and increased energy expended than were the two lowest income groups. The combination strategy of food restriction and increased physical activity was articulated by 36.9 percent of women from the greater than 185 percent of the FPG group and 31.4 percent of women from the 131 to 185 percent of the FPG group, while significantly fewer women from FSP households and income eligible households not receiving FSP benefits (both groups ≤ 130 percent of the FPG) reported the recommended strategy (23.0 percent and 22.3 percent, respectively) (Figure 1).

Figure 1

Perceived Effective Weight Control Strategies by SNAP# (CalFresh) Participation and Income Among California Women, 2009



Supplemental Nutrition Assistance Program , now named CalFresh in California
^ Household
* Physical activity plus diet; $P < .05$ lower between both ≤ 130% FPG group and each of the higher income groups
** Physical activity alone, $P < .05$ higher between both ≤ 130% FPG group and each of the higher income groups
*** Federal Poverty Guideline
Not a SNAP participant, but household income is at SNAP qualifying cutpoint ≤ 130% Federal Poverty Level

Source: California Women's Health Survey, 2009

Perceived Effective Weight Control Strategies by Supplemental Nutrition Assistance Program Participation and Income Among California Women, 2009

California Department of Public Health
Cancer Control Branch
Network for a Healthy California

1 Andreyeva T, Long MW, Henderson KE, Grode GM. Trying to lose weight: diet strategies among Americans with overweight or obesity in 1996 and 2003. *J Am Diet Assoc*. 2010;110(4):535-542.

2 Behavioral Risk Factor Surveillance System California data unpublished analysis, California Department of Health Services. Sacramento, CA. 2009.

3 United States Department of Agriculture Center for Policy and Promotion. Dietary Guidelines.gov. Report of the Dietary Guidelines Advisory Committee on the Dietary Guidelines for Americans, 2010, Part B. Section 2: The Total Diet: Combining Nutrients, Consuming Food. www.cnpp.usda.gov/DGAs2010-DGACReport.htm. Updated July 2010. Accessed October 2010.

4 Shaw K, Gennat H, O'Rourke P, Del Mar C. Exercise for overweight or obesity. *Cochrane Database Syst Rev*. 2006;(4):CD003817.

5 Kruger J, Galuska DA, Serdula MK, Jones DA. Attempting to lose weight: specific practices among U.S. adults. *Am J Prev Med*. 2004;26(5):402-406.

6 The federal Food Stamp Program is now called the Supplemental Nutrition Assistance Program (SNAP), and in California the program is now called CalFresh. SNAP-Ed is the acronym for the nutrition education provided to SNAP participants.

Submitted by: Sharon B. Sugerman, M.S., R.D., Patrick Mitchell, Dr.PH., and Barbara MkNelly, M.S., California Department of Public Health, Cancer Control Branch, *Network for a Healthy California*, (916) 449-5406, Sharon.Sugerman@cdph.ca.gov

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RESULTS FROM THE 2009 CALIFORNIA WOMEN'S HEALTH SURVEY

Perceived Body Size Vs. Self-Reported Weight Among Adult Women in California, 2005-2009

California Department of Public Health
Cancer Surveillance and Research Branch
Survey Research Group Section
California Department of Public Health
Research and Evaluation Unit
Policy Planning and Evaluation Section
Cancer Control Branch

As awareness of obesity as a public health problem increases, it is important that people have an accurate perception of their body weight regardless of their weight status. Erroneous perception of body weight can have important health consequences.[1] Overweight individuals who do not believe they are overweight may not intervene effectively to control their weight. Conversely, underweight individuals who perceive themselves as normal or overweight may engage in unnecessary dieting or even extreme weight control practices such as binging and purging. The California Department of Public Health administers a number of programs that focus on obesity risk reduction. Discrepancies between actual weight and perceived weight can impede the acceptance or effectiveness of interventions to "achieve a healthy body weight."[2]

This study used data from 24,548 respondents from the 2005 to 2009 California Women's Health Survey to compare women's self-perceived weight category with their actual weight by age, race, education, poverty status, and marital status. Women's self-reported height and weight were used to calculate body mass index (BMI): BMI = [(weight (lb) * 703) / (Height^2 (in^2)]. A women's perceived weight category was based on the following question: *Currently, do you consider yourself overweight, underweight, or about the right weight for your height?* Women were categorized into four weight levels based on BMI. BMI less than 19 was defined as underweight; BMI equal to or greater than 19, but less than 25 was defined as healthy weight; BMI equal to or greater than 25, but less than 30 was defined as overweight; and BMI equal to or greater than 30 was defined as obese. Overweight and obese categories were combined, and BMI equal to or greater than 25 was defined as "overweight or obese." This analysis did not focus on women who were defined as "healthy weight" because these women are less likely to have problems due to their misperception. Misperception of weight was defined as underestimating or overestimating one's actual weight.

Responses were weighted in these analyses by age and race/ethnicity to reflect the 2000 California adult female population. To control for confounding when examining misperceptions by race, estimates for race were stratified by age (less than age 45 and greater than or equal to age 45). Because of small sample sizes by age and race, misperceptions by age and race were analyzed for overweight and obese women combined. Unless otherwise noted, all reported differences were significant at *P* less than .05.

Classification by BMI indicated that 23.6 percent of women were obese, 27.3 percent were overweight, 44.5 percent were at a healthy weight, and 4.6 percent were underweight. A high percentage of women had misperceptions about their weight, with underweight women more likely to misclassify themselves compared with overweight or obese women. Among underweight women, 2.6 percent thought they were overweight, and 60.5 percent thought their weight was about right (total misperception equaled 63.1 percent). Among

Public Health Message:
Substantial numbers of underweight and overweight California women misperceive their weight status, and misperceptions are greater among women with low income and low education. Public health messages that enable women to correctly identify body weight status are important for engaging their participation in risk reduction activities. Greater misperception about weight among women with low income and low education points out the importance of tailoring such public messages to specific population subgroups.

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Perceived Body Size Vs. Self-Reported Weight Among Adult Women in California, 2005-2009

California Department of Public Health
Cancer Surveillance and Research Branch
Survey Research Group Section
California Department of Public Health
Research and Evaluation Unit
Policy Planning and Evaluation Section
Cancer Control Branch

overweight women, 28.4 percent underestimated their weight was about right and 0.5 percent thought they were underweight (total misperception equaled 28.9 percent). Among obese women, 5.2 percent thought that their weight was about right and 0.4.percent though they were underweight (total misperception 5.6 percent) (Figure 1). Combining the categories of overweight and obese women, 18.1 percent thought their weight was about right or that they were underweight.

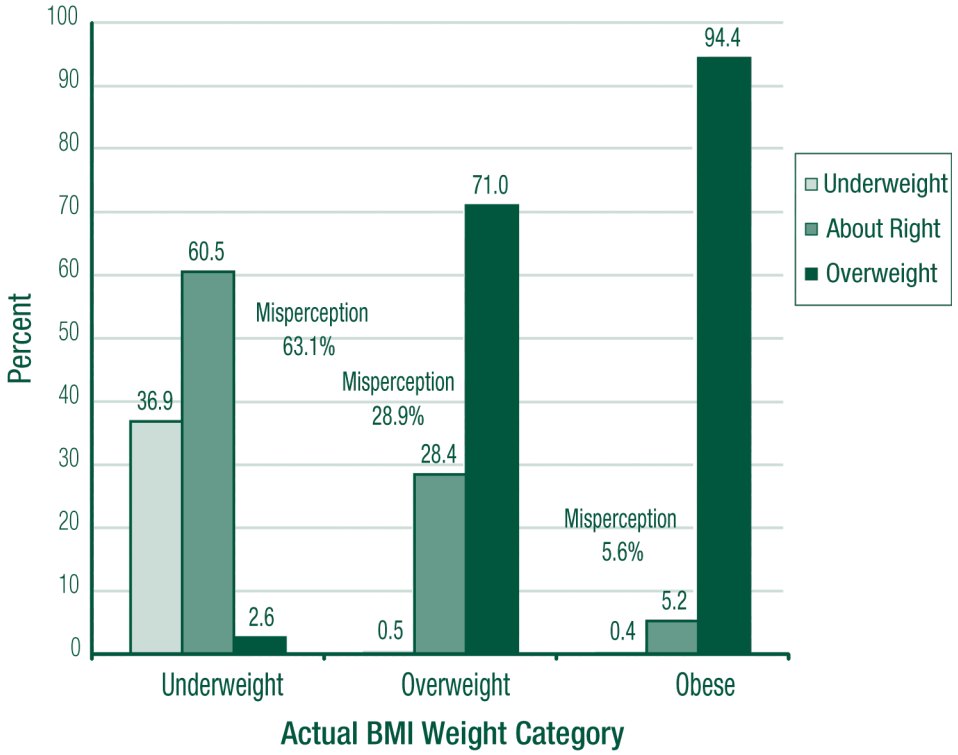
Among women who were overweight or obese, Hispanics were more likely than Whites to underestimate their weight category if they were younger than age 45 (23.2 percent vs. 15.7 percent) or were at least 45 years old (22.8 percent vs. 13.4 percent). Among obese or overweight women at least 45 years old, African Americans/Blacks were more likely than Whites to underestimate their weight (24.1 percent vs. 13.4 percent), but no significant difference was found between these groups among women younger than age 45.

Misperceptions about weight varied strongly by education and by poverty status among women in all underweight and overweight BMI categories.

- Obese and overweight women with less education were more likely to underestimate their body weight status than women with more education. Among obese women, those with less than a high school education were more likely than more educated women to underestimate their weight (13.4 percent vs. 3.5 percent, respectively); the same trend was found

Figure 1

Percent of Women Who Misperceived Weight Category by Actual Body Mass Index (BMI) Weight Category, 2005-2009



Source: California Women's Health Survey, 2009

California Department of Public Health
Cancer Surveillance and Research Branch
Survey Research Group Section
California Department of Public Health
Research and Evaluation Unit
Policy Planning and Evaluation Section
Cancer Control Branch

in less educated vs. more educated overweight women (42.3 percent vs. 26.1 percent, respectively). In contrast, among underweight women, high school education level was not related to misperceptions about weight.

- Obese and overweight women from low income households were more likely to underestimate their weight than were women from higher income households. Among obese women, 9.6 percent of those at or below 130 percent of the federal poverty level (FPL) underestimated their weight status to be about right or underweight vs. 5.1 percent of those between 131 percent and 185 percent of the FPL, and 2.5 percent of those with household income more than 185 percent of the FPL.[3] Among overweight women, 38.4 percent of those from low income households ($\leq$ 130 percent of the FPL) underestimated their weight vs. 32.5 percent from those at 131 percent to 185 percent of the FPL and 23.3 percent among those at or above 185 percent of the FPL.[3]

- Among underweight women, 65.3 percent of those living in high income households $\geq$185 percent of the FPL) overestimated their weight status as about right or overweight, as did 55.5 percent of those living in households with income $\leq$130 percent of the FPL; however, the difference was not statistically significant.

1 Kuchler F, Variyam JN. Mistakes were made: misperception as a barrier to reducing overweight. *Int J Obes Relat Metab Disord*. 2003;27(7):856-861.

2 Zapka J, Lemon SC, Estabrook B, Rosal MC. Factors related to weight loss behavior in a multiracial/ethnic workforce. *Ethn Dis*. 2009;19(2):154-160.

3 Among obese and among overweight women, rates were significantly different for any pairing of the poverty level categories.

4 Paeratakul S, White MA, Williamson DA, Ryan DH, Bray GA. Sex, race/ethnicity, socioeconomic status, and BMI in relation to self-perception of overweight. *Obes Res*. 2002; 10(5):345-350.

Submitted by: Joan Epstein, M.S., California Department of Public Health, Cancer Surveillance and Research Branch, Survey Research Group, Sharon Sugerman, M.S., R.D., California Department of Public Health, Research and Evaluation Unit, Policy Planning and Evaluation Section, Cancer Control Branch, and Marta Induni, Ph.D., California Department of Public Health, Cancer Surveillance and Research Branch, Survey Research Group Section, (916) 779-0114, jepstein@ccr.ca.gov

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RESULTS FROM THE 2009 CALIFORNIA WOMEN'S HEALTH SURVEY

Food Security Status and the Prevalence of Diet-Related Chronic Diseases Among California Women, 2009

California Department of Public Health
Cancer Control Branch
Network for a Healthy California
Public Health Institute

The U.S Department of Agriculture (USDA) defines food insecurity as the limited or uncertain availability of nutritionally adequate and safe foods or the limited or uncertain ability to acquire acceptable foods in socially acceptable ways.[1] National studies have demonstrated an association between food insecurity and diet-related chronic diseases among adults such as diabetes, hypertension, and high cholesterol.[2] This analysis examines whether a similar association is also evident among California women. The *Network for a Healthy California* is committed to improving food security, increasing fruit and vegetable consumption, and increasing physical activity among low income Californians with the goal of preventing obesity and other diet-related chronic diseases. When households lack the economic resources for enough food or enough good quality food, women and their families are less able to maintain the type of healthy diets associated with a lower risk of chronic disease.

This analysis was limited to the 3,530 women, younger than age 65, participating in the 2009 California Women's Health Survey who completed the USDA's standardized six-item validated short form of the food security scale. Responses were used to categorize women into three groups: food secure, low food security, and very low food security. Women participating in the survey were asked: *Have you ever been diagnosed with any of the following: diabetes, heart disease, high blood pressure, or high cholesterol?* Women diagnosed with gestational diabetes were excluded from the diabetes-related analysis. Self-reported height and weight were used to identify body mass index (BMI). Results were stratified by age, race/ethnicity, education, BMI, and household income by ratio to Federal Poverty Guidelines (FPG) as follows: < 100 percent FPG, 100-249 percent FPG, and >250 percent FPG). Responses were weighted by age and race/ethnicity to reflect the 2000 California adult female population.

Bivariate analysis was conducted to assess the association between food security status and the prevalence of self-reported chronic disease. Multivariate analysis was used to further control for the women's age, race/ethnicity, three income categories, education, and BMI. All reported findings were statistically significant at *P* less than .001 unless otherwise specified.

California women under age 65 reported the following rates of chronic disease: non-gestational diabetes, 5.5 percent; heart disease, 2.7 percent; high blood pressure, 16.1 percent; and high cholesterol, 18.2 percent. Because these rates were not clinically determined, they likely reflect under-reporting of actual chronic disease prevalence especially among women with limited access to health care. While the majority of women lived in households classified as food secure (69.3 percent), nearly one third reported being food insecure. Almost one in five (19.7 percent) lived in households having low food security, and more than one in ten (11.1 percent) had very low food security. The reported prevalence of each of the four diet-related chronic diseases was highest

Public Health Message:
Nearly one third of all California women were food insecure. High blood pressure remained positively associated with food insecurity even when demographics were controlled. Since self-reported diabetes, high cholesterol, and heart disease are likely underestimated among women with poor access to health care, a positive association with food insecurity may be underestimated. Economic, educational, and environmental interventions are needed to better ensure that the most nutritionally vulnerable women have access to affordable healthy food to help them manage and reduce diet-related, chronic diseases.

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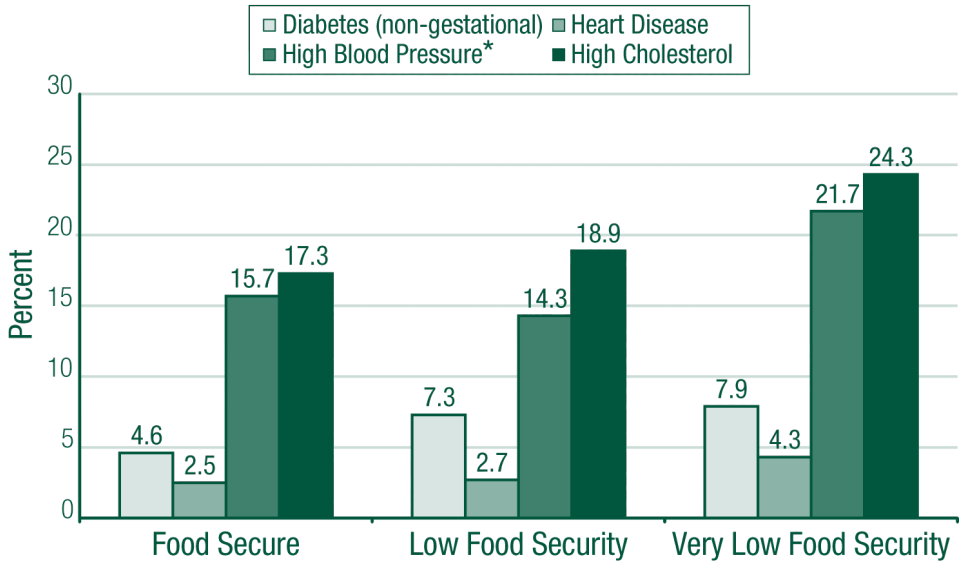
among women having very low food security (Figure 1).

Figure 1

Prevalence of Diet-Related Chronic Diseases by Food Security Status Among California Women, 2009



* Food insecurity status was positive and significant ($P < .05$) even after controlling for women's age, income level, education level, and race/ethnicity.
Source: California Women's Health Survey, 2009

Diabetes

In the simple bivariate analysis, food insecurity was positively and significantly associated ($P < .01$) with non-gestational diabetes, with a rate of 7.9 percent among women living in households with very low food security and 7.3 percent among women with low food security vs. 4.6 percent among food secure women (Figure 1). After controlling for other demographic factors with the adjusted model, food security status was no longer significantly associated with non-gestational diabetes, while older age, higher BMI, race/ethnicity, and lower education level were significantly related ($P < .01$).

Heart Disease

The reported prevalence of diagnosed heart disease was not significantly different across the three food security groups: 4.3 percent among women classified as very low food security; 2.7 percent among women living in households with low food security; and 2.5 percent among food secure women (Figure 1). With the adjusted model, food security status was not significantly different across the groups of women; however, income level ($P < .01$), education level ($P < .01$), and age were each significantly associated with heart disease in the expected direction.

High Blood Pressure

The reported prevalence of diagnosed high blood pressure was significantly different by food security status, with a rate of 21.7 percent among women classified as very low food security; 14.3 percent among women living in households with low food security; and 15.7 percent among food secure women ($P < .05$). Even with the adjusted model, food insecurity status was positively and significantly related to high blood pressure ($P < .05$), as were older age and higher BMI.

High Cholesterol

The reported prevalence of diagnosed high cholesterol was significantly different by food security status, with a rate of 24.3 percent among women classified as very low food security; 18.9 percent among women living in households with low food security; and 17.3 percent among food secure women ($P < .05$). With the adjusted model, food security status was no longer significantly associated with high cholesterol although age and BMI were positively and significantly related.

1 Food Security in the United States: Measuring Household Food Security. United States Department of Agriculture. Economic Research Service. http://www.ers.usda.gov/Briefing/FoodSecurity/measurement.htm. Accessed February 4, 2011.

2 Seligman HK, Laraia BA, and Kushel MB. Food insecurity is associated with chronic disease among low-income NHANES participants. *J. Nutr.* 2010;140:304-310.

3 Bickel G, Nord M, Price C, Hamilton W, Cook J. Guide to measuring food security, revised 2000. Alexandria, VA; Food and Nutrition Service, US Dept. of Agriculture; 2000.

Submitted by: Barbara MkNelly, M.S., Sharon B. Sugerman, M.S., R.D., and Patrick Mitchell, Dr.P.H., California Department of Public Health, Cancer Control Branch, Public Health Institute, (916) 552-9938, Barbara.MkNelly@cdph.ca.gov

OFFICE OF WOMEN'S HEALTH
CALIFORNIA DEPARTMENT OF HEALTH CARE SERVICES AND CALIFORNIA DEPARTMENT OF PUBLIC HEALTH

Data Points

CWHS

RESULTS FROM THE 2009 CALIFORNIA WOMEN'S HEALTH SURVEY

The Most Important Meal of the Day - California Women and Breakfast, 2009

California Department of Public Health
Cancer Control Branch
Network for a Healthy California
Public Health Institute

Eating a healthy breakfast has long been encouraged as a sound nutrition practice for starting the day. Several studies have found an inverse relationship between body weight and breakfast consumption.[1] Eating breakfast is one of the habits characteristic of people who are successful at maintaining weight loss and is associated with lower body mass index among adults with type 2 diabetes.[2,3]

The California Department of Public Health's *Network for a Healthy California* program promotes good nutrition and physical activity among low income Californians, with the goal of preventing obesity and other diet-related chronic diseases. These analyses were conducted with the 4,334 non-pregnant women participating in the 2009 California Women's Health Survey who answered the question: *Over the last month (past 30 days), how many times per month, week, or day did you eat breakfast or any morning meal?* Women were also asked sociodemographic questions to classify their household income by ratio to Federal Poverty Guidelines (FPG) and to identify their participation in the Food Stamp Program. Further questions established other demographic characteristics such as age, race/ethnicity, education level, as well as general health and food security status (i.e., the ability to afford enough food for an active, healthy life). Self-reported weight and height were used to calculate body mass index (BMI). Responses were weighted in these analyses by age and race/ethnicity to reflect the 2000 California adult female population. Chi square tests were used for the analysis, and all findings are statistically significant at $P < .001$ unless otherwise specified.

Almost two thirds of California women (61.8 percent) reported eating breakfast. Significant associations were found between eating breakfast daily and variables associated with higher socioeconomic status:

- Only 51.9 percent of respondents living in households with income below the FPG (< 100 percent of FPG) reported eating breakfast daily vs. 59.4 percent of women from households 100 to 249 percent of FPG, and 65.6 percent of women from households 250 percent, or greater than the FPG (Figure 1).
- Household food security was significantly associated with eating breakfast daily: 66.8 percent of women living in food secure households reported that they ate breakfast daily vs. 53.8 percent living in households with low food security and only 38.3 percent living in households with very low food security.
- No significant difference was found in those reporting they ate breakfast daily among women receiving food stamps (52.3 percent) and women not receiving food stamps, but who were at or below 130 percent FPG and were therefore income eligible to do so (54.4 percent).
- The majority of women who had graduated from college (68.2 percent) reported eating breakfast daily, as did 54.0 percent of women with some

Public Health Message:
Women who are young, African American/Black, living in poverty, or who have very low food security were significantly less likely to eat breakfast daily. Although a healthy breakfast is a promising weight loss and weight management strategy, significantly fewer overweight or obese women or those who had tried to lose weight ate breakfast daily. Nutrition messaging and obesity prevention strategies emphasizing the importance of a regular, healthy breakfast can be especially useful among these segments of California women.

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college, 59.8 percent of high school graduates, and 62.4 percent of women with less than a high school education.

Age and race/ethnicity were also significantly associated with eating breakfast daily:

- Eating breakfast daily was progressively more common in older age groups: 50.1 percent among women ages 18 to 29; 56.0 percent among women ages 30 to 39; 60.1 percent among women ages 40 to 49; 65.9 percent among women ages 50 to 59; and 77.0 percent among women ages 60 and older.

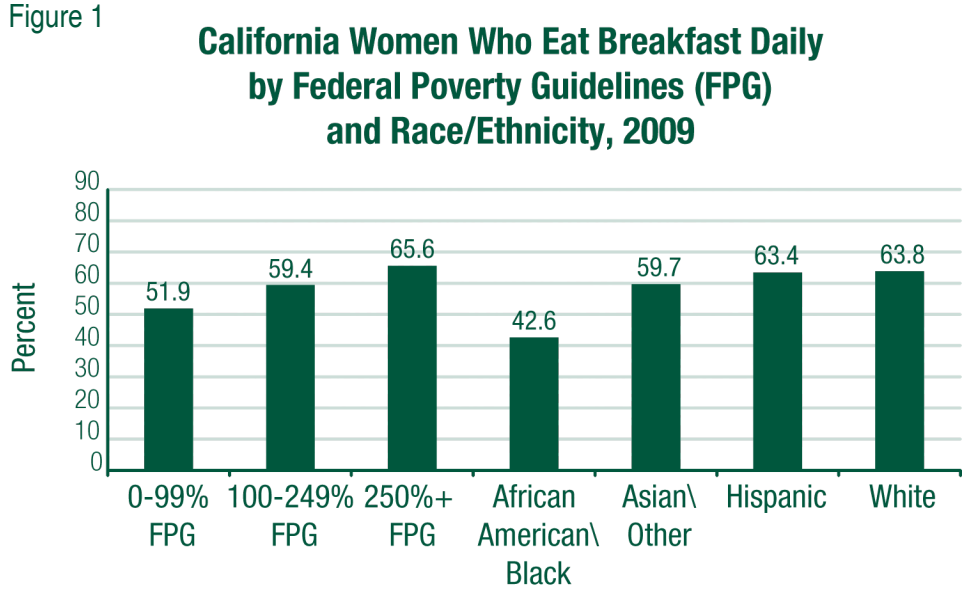
- Less than half (42.6 percent) of African American/Black women reported eating breakfast daily vs. 59.7 percent of Asian/Other women, 63.4 percent of Hispanic women and 63.8 percent of White women (Figure 1).

Regular breakfast eating was also significantly associated with indicators reflecting better health:

- Women who reported being in "excellent" or "very good" health were significantly more likely to be daily breakfast eaters (65.1 percent) than women who described their health as "fair" or "poor" (56.9 percent). Of those in "good" health, 58.6 percent ate breakfast daily.

- Women who were overweight or obese were significantly less likely to report eating breakfast daily (56.6 percent) than women who were not (61.9 percent) ($P < .01$). Also, significantly fewer women who had tried to lose weight during the past 12 months reported eating breakfast daily than those who had not tried to lose weight (59.7 percent vs. 64.5 percent, respectively; $P < .05$).

Figure 1



Source: California Women's Health Survey, 2009

1 The Report of the Dietary Guidelines Advisory Committee on Dietary Guidelines for Americans, 2010. Section 1: Energy Balance. United States Department of Agriculture. http://www.cnpp.usda.gov/Publications/DietaryGuidelines/2010/DGAC/Report/D-1-EnergyBalance.pdf. Accessed Septermber 2010.

2 Wyatt HR, Grunwald GK, Mosca CL, Klem ML, Wing RR, Hill JO. Long-term weight loss and breakfast in subjects in the National Weight Control Registry. *Obes Res.* 2002;10(2):78-82.

3 Raynor HA, Jeffery RW, Ruggiero AM, Clark JM, Delahanty LM: Look AHEAD (Action for Health in Diabetes) Research Group. Weight loss strategies associated with BMI in overweight adults with type 2 diabetes at entry into the Look AHEAD (Action for Health in Diabetes) trial. *Diabetes Care.* 2008;31(7):1299-1304.

Submitted by: Barbara MkNelly, M.S., Sharon B. Sugerman, M.S., R.D., and Patrick Mitchell, Dr.P.H., California Department of Public Health, Cancer Control Branch, Public Health Institute, (916) 552-9938, Barbara.MkNelly@cdph.ca.gov

MARKET Independent

THE OFFICIAL PUBLICATION OF THE NEIGHBORHOOD MARKET ASSOCIATION ISSUE 50, 2012

their 3rd MEETING

For the third time since 2008, Mark Paul Arabo, President and CEO of the Neighborhood Market Association, meets with U.S. President Barack Obama

Your NMA President meets again with Obama

ALSO IN THIS ISSUE:

ALIGNING CUSTOMER REALITY WITH EMPLOYEE PERCEPTION

LEGAL: SEATING CLASS ACTIONS ON THE RISE

16TH ANNUAL BANQUET

SPOTLIGHT: NMA COUNSEL

4 REASONS YOU DIDN'T GET THAT BUSINESS LOAN

RELATIONSHIPS AND TOUGH DECISIONS

SACRAMENTO SCENE

CILANTRO TO STORES

ARE YOUR CUSTOMERS PROMOTING YOUR BUSINESS?

Cilantro to Stores

Fresh, local produce now delivered to four Chula Vista Convenience Stores

For many families in San Diego County, walking to the local convenience store for groceries is not only commonplace, it's the only choice. Gas money is scarce, and reserved for trips to work and school.

With the help of the Cilantro to Stores program, these convenience stores are showing how fresh produce from local farmers can be made available to these shoppers, boosting business for the store and farmer, and helping keep families healthy.

Cilantro to Stores involves four convenience stores in western Chula Vista that received new equipment enabling them to prominently display and sell fresh produce grown at local farms. Each week, "Farmer Steve" White, a Ramona, CA farmer, delivers and stocks this produce.

Roy Mikha, store manager at Sunset Market & Liquor, said he is honored to help facilitate this program in his store. Mikha has first-hand knowledge of the consumption habits of his clientele, and as he grew up on a farm, it is a natural fit to advocate for the consumption of more fruits and vegetables in his neighborhood.

"You guys can have real fruit," Mikha tells groups of local high school students that frequent his store after school ends for the day.

Cilantro to Stores answers an overwhelming request from Chula Vista community members for more fruits and vegetables within easy reach, and a cleaner façade of the strip malls where the stores are located. We may be living in a fast-paced world, but access to something as simple as a crunchy green bell pepper is a daily struggle for many of our neighbors.

The effort to keep prices low and taste high by providing locally grown produce has resulted in a farmer's market style of availability. Harvesting local produce keeps cost low and adds a unique aspect through the special relationships developed with the store owners and community.

All four stores have agreed to continue stocking their shelves with local fruits and vegetables in efforts to maintain the program for at least one year. Cilantro to Stores is yielding positive public-health change welcomed by its community.

In speaking to this positive community reaction, Eric McDonald, San Diego County Deputy Public Health Officer said "From improving the design and walkability of our community, to increasing the availability and affordability of fresh fruits and vegetables, we are providing easier access for healthy choices for the residents of San Diego County."

Made possible in part by a Healthy Works grant from the San Diego Association of Governments (SANDAG) to the City of Chula Vista, the Cilantro to Stores project was designed and implemented by the Childhood Obesity Initiative - facilitated by Community Health Improvement Partners – with other partners including the San Diego Nutrition Network, who provided various nutrition education tools for customers. The Neighborhood Market Association played a key role through their relationship with the store owners.

The San Diego Nutrition Network hopes this program can be a model for change and spark interest with other store owners throughout the county and state to implement similar programs.

For more information, please contact:
Chelsea Fiss
Retail Program Manager
Network for a Healthy California San Diego and Imperial Region
Phone 619 681 0657
Email cfiss@ucsd.edu

Humboldt CAN: Eat Well, Get Moving, Feel Good

Celebrate Food Day

Community events call attention to food access issues in Humboldt County

Oct. 24 is Food Day. This nationwide celebration of and movement toward more healthy, affordable, sustainable food and a better food system will be observed locally with several special events.

“I’m thrilled that people across the county will join in the celebration and mobilize for a change, starting with drawing attention to the neighborhoods and rural populations in Humboldt County where residents lack access to sources of healthy, fresh, affordable food,” said Laura McEwen, coordinator of the Humboldt Food Policy Council.

According to national organizers, Food Day is a chance to celebrate what our food system does right and take action to bring us closer to a food system with “real food” that is produced with care for the environment, animals and the women and men who grow, harvest and serve it. Food Day’s priorities are to:

- Promote safer, healthier diets
- Support sustainable and organic farms
- Reduce hunger
- Reform factory farms to protect the environment
- Support fair working conditions for food and farm workers.

Locally, people are invited to join together for a Food Day event on Oct. 24 from 6 to 7:30 p.m. in the Eureka High School Lecture Hall at 1915 J St. Those attending will have an opportunity to:

- View a small portion of the HBO documentary “The Weight of the Nation,” followed by a discussion about how we can impact our community health, such as getting more healthy foods in local communities. The discussion will be led by Stefan Harvey of the California Center for Public Health Advocacy.
- Talk with students who are working on installing a source of water at Eureka High School to refill reusable bottles.
- Meet Community Nutrition Action Partners and learn about the resources available for your neighborhood projects.

United Indian Health Services is also hosting a Food Day event for its clients on Oct. 24 from noon to 2 p.m.

“We are excited about Food Day and the chance to hear about local endeavors that are working on creating a healthier food system in Humboldt County,” said Department of Health and Human Services (DHHS) Public Health Nutritionist Colleen Ogle. “Food Day is not just a daylong event, but an opportunity to make a permanent change that supports a more sustainable and healthy future.”

If you are celebrating Food Day with a dinner or potluck at your home, consider adding this recipe to your menu. For other healthful recipes, visit www.foodday.org.

GREEN BEAN SALAD WITH RED ONION AND SALSA DRESSING
(Adapted from “Mexican Everyday” by Rick Bayless)

- 1 pound green beans, trimmed
- 1 small red onion, thinly sliced
- 3 tablespoons olive oil
- 3 tablespoons bottled salsa, preferably green tomatillo salsa
- 2 teaspoons fresh lime juice
- 3 sprigs cilantro, plus more for garnish
- ¼ teaspoon kosher salt

Steam the green beans until tender-crunchy, about 3 minutes. Allow them to cool, then toss with the red onion in a large bowl.

Combine the remaining ingredients in a blender or mini food processor. Process until Smooth to make dressing. Toss the dressing with the green beans and red onion. Garnish with some cilantro leaves. Makes 6 servings.

Nutrition information per serving: 90 calories; 7 g total fat; 1 g saturated fat; 0 mg cholesterol; 140 mg sodium; 7 g carbohydrate; 1 g protein; 2 g dietary fiber.

Kelley Kyle is the senior health education specialist for DHHS Public Health.