Understanding Nutrition: Primer Module on Diet

Compelling evidence demonstrates that eating a high-fiber, low-fat, low-sugar diet rich in fruits, vegetables and whole grains reduces the risk of many diseases.[1]

At the national level, the Department of Health and Human Services (DHHS) and the Department of Agriculture (USDA) recommend an evidence-based diet in their recent jointly published *Dietary Guidelines for Americans, 2010*.[2, a] This publication is used to develop nutrition education materials and to aid policymakers in designing and implementing nutrition-related programs, including federal food programs such as school meals and Meals on Wheels for seniors. The *Dietary Guidelines* are updated every five years, with the next revision due in 2015.

Following an overview of the *Guidelines*, this primer module presents data describing the latest dietary trends nationally and in California, with an emphasis on fruit and vegetable consumption.

Dietary Guidelines for Americans, 2010

The *Dietary Guidelines for Americans, 2010* present 23 key recommendations for the general population and 6 additional recommendations for specific populations (such as pregnant women). The *Dietary Guidelines* emphasize three priority goals:

- Balance calories with physical activity to manage weight;
- Consume more fruits, vegetables, whole grains, seafood, and fat-free and low-fat dairy products; and
- Consume less food with salt, saturated fats, trans fats, cholesterol, added sugars, and refined grains.

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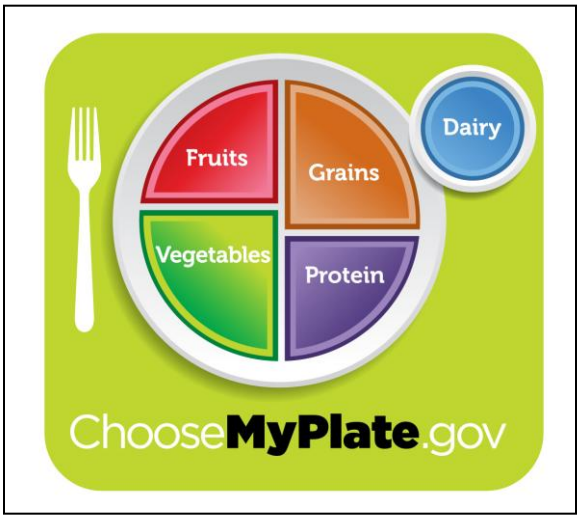
[a] The *Dietary Guidelines for Americans, 2010* is based on the *Report of the Dietary Guidelines Advisory Committee on the Dietary Guidelines for Americans, 2010*, which can be found online at: http://www.cnpp.usda.gov/dgas2010-dgacreport.htm

The *Dietary Guidelines* also introduce a new graphic, *MyPlate* (see below), which replaces the iconic *Food Guide Pyramid*, first introduced in 1992. *MyPlate* is designed to remind consumers to make healthier food choices by filling half their plate with a variety of colorful (e.g., red, orange, and dark-green) vegetables and fruits, and to fill the other half with lean proteins, whole grains and low-fat dairy.

The USDA website features a "go-to" online tool (www.ChooseMyPlate.gov). This tool allows consumers to personalize and manage their dietary and physical activity choices using the nutritional advice in the 2010 *Dietary Guidelines.*

USDA provides additional information and links to multi-cultural food guides, including a Native American food pyramid, Asian diet pyramid, Mediterranean diet pyramid, and a Japanese food guide "spinning top."[3]



U.S. Profile

The diets of most Americans do not align with advice in the 2010 *Dietary Guidelines* or in previous dietary guidelines.

Adults (BRFSS)

The Behavioral Risk Factor Surveillance System (BRFSS) is the only ongoing source of state-based dietary information that tracks any aspect of dietary intake for adults. Its six dietary questions are for fruits and vegetables and allow comparison of trends in California with those of the rest of the nation.

Fruit and Vegetable Consumption

- In 2009, only 23.4% of U.S. adults reported eating the recommended five or more servings of fruits and vegetables per day, a 0.2 percentage point increase from 23.2% in 2000.[4]

- In 2009, consumption of the recommended minimum servings of fruits and vegetables varied by gender and race/ethnicity (see Table 1). Each group was more likely to eat fruit the recommended number of times than vegetables. A higher percentage of women met recommendations, compared to men.

- Hispanics were more likely to report eating fruit twice a day (37.2%), compared to Black or white non-Hispanic race/ethnic groups. However, Hispanics were the least likely to eat vegetables three or more times per day than any of the other race/ethnic groups.[5]

Table 1. Adult Fruit & Vegetable Consumption – Gender & Race/Ethnicity Percent of U.S. Adults Who Consumed Recommended Minimums of Fruits and Vegetables Behavioral Risk Factor Surveillance System, 2009		
	Fruit 2 or more times per day	**Vegetables 3 or more times per day**
Male	28.7	21.4
Female	36.1	30.9
Hispanic	37.2	19.7
African American	33.7	21.9
White	31.1	27.7
Other	36.2	30.9
Source: Centers for Disease Control and Prevention. (September 10, 2010). *State-Specific trends in Fruit and Vegetable Consumption among Adults – United States, 2000-2009.* Retrieved from http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5935a1.htm		

National/State Comparison

- In 2009, adult Californians reported consuming two or more daily servings of fruits at higher rates than nationally and were nearly equal to the U.S. overall in consuming three or more daily servings of vegetables (see Table 2). Between 2000 and 2009, consumption of fruit in California was stable, compared to a decline nationally, while vegetable consumption increased significantly in California.

Table 2. Changes in Adult Fruit & Vegetable Consumption Percent of U.S. and California Adults Who Consumed Recommended Minimums of Fruits and Vegetables Behavioral Risk Factor Surveillance System, 2000 and 2009				
	Fruit 2 or more times per day		**Vegetables 3 or more times per day**	
	2000	**2009**	**2000**	**2009**
U.S.	34.4	32.5*	26.7	26.3
California	40.7	40.1	23.3	26.8**
* Statistically significant decrease (p<0.05). **Statistically significant increase (p<0.05).				
Source: Centers for Disease Control and Prevention. (September 10, 2010). *State-Specific Trends in Fruit and Vegetable Consumption among Adults – United States, 2000-2009.* Retrieved from http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5935a1.htm				

Discretionary Calories (NHANES)

According to the 2001-2002 National Health and Nutrition Examination Survey (NHANES), the average American adult consumes 30% to 42% of their total calorie intake from solid fat, alcohol, and added sugar, which, according to the *Dietary Guidelines*, should collectively comprise no more than 8% to 20% of total calories.[6]

Youth and Children

The national Youth Risk Behavior Survey[a] provides the only state-based information available on dietary habits of youth (ages 12-17) throughout the country:

- 23.9% of youth reported eating five or more daily servings of fruits and vegetables in 1999, decreasing to 22.3% in 2009.
- 14.0% ate vegetables three or more times a day in 1999, dropping to 13.8% in 2009.
- 34.8% ate fruit or drank 100% fruit juices two or more times per day in 1999, declining to 33.9% in 2009.
- 33.8% drank soda or diet pop at least once a day in 2007 (the first year this data was available), dropping to 29.2% in 2009.[7]

Beverages

- Analyzing data from the 2010 National Youth Physical Activity and Nutrition Study, the Centers for Disease Control and Prevention (CDC) found that 24.3% of high school students reported drinking a serving of regular soda or pop, 16.1% drank a serving of a sports drink, and 16.9% drank of serving of another sugar-sweetened beverage one or more times per day during the seven days prior to the survey.[8]

Snacks

- According to nationally representative surveys,[b] among children (2-18 years old) the prevalence of snackers increased from 74% in 1977-78 to 98% in 2003-06 (% of snackers over a two-day period).

- Over 27% of daily calories consumed by children (mainly from desserts and sweetened beverages) now come from nearly three snacks a day.[9]

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[a] While most states take part in the Youth Risk Behavior Survey, California has not participated in the survey on a statewide basis for a number of years (though data has been collected in four urban school districts).

[b] The national surveys used in this study included the 1977-78 Nationwide Food Consumption Survey, the 1989-91, 1994-96 and 1998 Continuing Survey of Food Intake by Individuals, and the 2003-06 joint USDA and National Health and Nutrition Examination Surveys.

California Profile

It is necessary to turn to a number of surveys (see Appendix A) to construct a profile of the dietary habits of California adults, youth and children.

Adults

In addition to the BRFSS discussed above, data about adult dietary practices in California can be mined from two primary sources – the California Behavioral Risk Factor Surveillance System (CBRFSS) for fruits and vegetables and the California Dietary Practices Survey (CDPS) for a wider variety of foods.[a]

- To more accurately represent the diverse populations in California, CDPH weights its BRFSS data to the Department of Finance 2000 U.S. Census California population demographics.

- The smaller CDPS oversamples sup-populations and weights the data to the Department of Finance 2000 U.S. Census California population demographics to derive better estimates for California's diverse population so that they accurately reflect the age, race, and gender of California adult residents.

Below are highlights from both surveys.

Adult Fruit and Vegetable Consumption - CBRFSS

According to the CBRFSS, the percent of adults who meet the previously recommended 5+ daily servings of fruit and vegetables increased modestly in most but not all sub-groups and remained well below the federal guideline (see Appendix B). [10]

See Appendix B for findings from the CBRFSS.

Specific findings from the CBRFSS include:

Total Population

- From 2000 to 2009, the percent of adults who met the recommended 5+ daily servings increased by 4.4 percent, to 28.6%.

Gender

- In 2000, 33.8% of women met the recommended 5+ daily servings in 2000, as did 34.0% of women in 2009, higher percentages for both years than their male counterparts.

- Men showed a greater *increase* than women in fruit and vegetable consumption (from 20.8% in 2000 to 23.1% in 2009).

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[a] As a general purpose telephone survey, the BRFSS has six food frequency questions on fruits and vegetables. The California Dietary Practices Survey (CDPS) uses a detailed battery of questions that asks about specific fruit and vegetable choices at all eating occasions on the day preceding the phone survey. Both surveys are administered in Spanish as well as English; CDPS oversamples for low-income and CalFresh participation. The 2009 CDC report ranks California 5th highest in fruit and vegetable consumption in the U.S., up from 12th position in 2000. See: http://apps.nccd.cdc.gov/BRFSS/list.asp?cat=FV&yr=2009&qkey=4415&state=All

Race/Ethnicity

- Since 2000, modest increases have been seen in fruit and vegetable consumption in every ethnic group, with the exception of Hispanics/Latinos.

Age

- The oldest Californians (65+) had the highest percentage of any age group meeting the recommended 5+ daily servings in both 2000 and 2009.

- However, both this older group and the youngest (18-24 year olds) were the only age groups that saw a decrease from 2000 to 2009 in the percent of individuals meeting the guideline.

Income

- The highest earning income group ($75,000+) had the second highest percentage meeting the recommended 5+ daily servings of any income group in 2000 and the highest in 2009.

- The lowest income group ($<15,000) went from having the highest percent meeting the fruit and vegetable guideline in 2000 to the lowest percent in 2009.

Adult Fruit and Vegetable Consumption – *CDPS*

The CDPS, a biennial survey developed in 1989 to track key dietary behaviors among adult Californians, paints a more encouraging profile of adult fruit and vegetable consumption.[a] The most recent survey results are from 2007 and were published in the July 2011 issue of the *Journal of Nutrition Education and Behavior*. [11]

See Appendix C for findings from the CDPS.

The study found that (see Appendix C):

Total Population

- Over a 10-year period when national consumption was largely flat, California adults significantly increased their average daily servings of fruits and vegetables from 3.8 in 1997 to 5.2 in 2007 (or about 1.4 additional servings per day).

- Overall, the percentage of adults consuming 5+ fruit and vegetable servings per day rose from 33.0% in 1997 to 50.0% in 2007.

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[a] The CDPS data (Appendix C) differ from the CBRFS results (Appendix B) reported in this section. These discrepancies are possibly due to a number of factors, including: different interview instruments, approaches and questions; different diet intervals; and different levels of detail. In addition, different sampling frames were used: half of CDPS respondents were randomly contacted and half were contacted from current and recent CalFresh recipients, whereas BRFSS is population-based, or selected through a random-digit-dial process. Both are weighted to Department of Finance population statistics.

Race Ethnicity

- From 1999 to 2007, Asian/Pacific Islanders reported increasing their daily 5+ fruit and vegetable consumption by 136%. From 1997-2007, African Americans increased their daily 5+ fruit and vegetable consumption by 77.3%, a greater increase than for whites (54.5%) and Latinos (42.8%).

Income

- Adult Food Stamp recipients increased their 5+ fruit and vegetable servings by 47% between 2003 and 2007.[a]

Adult Consumption of High-Calorie, Low-Nutrient Food (CDPS)

In addition to providing information about fruit and vegetable consumption trends, the *California Dietary Practices Survey* (CDPS) also collects data on the consumption by adults of other healthy foods and of high-calorie, low-nutrient foods. [b]

In 2007, respondents reported that on *the previous day*:[12]

- 41.3% had one serving of high-calorie, low-nutrient food, and 25.0% had two or more servings.
- 39.5% of African Americans ate high-calorie, low-nutrient food at least two times, followed by 30.3% Asian/Other, 28.1% Latino, and 21.1% white.[c]
- 49.9% of respondents drank regular soft drinks or sweetened beverages, a 6.4% increase from 46.9% in 1999.
- 41.1% of adults who ate out had fast food, compared to 47.8% in 1999, a 14.0% decline.
- 19.6% who ate out asked about calorie information for menu items (22.3% of women vs. 16.7% of men).[d]

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[a] In 2003, a poverty index was added to the CDPS as a standard demographic measure. As a result, only four years of data are available.

[b] High-calorie, low-nutrient foods in this survey are defined by the California Department of Public Health as pastries, such as doughnuts, muffins, croissants; deep-fried foods, such as French fries, fried chicken, fried fish, onion rings; snack foods, such as chips; and desserts, such as cake, pie, cookies, ice cream, candy bars.

[c] This difference was significant at the $p < .001$ level.

[d] This difference was significant at the $p < .01$ level.

California Youth (12-17)

Information on the dietary practices of youth (ages 12-17) comes from the *California Teen Eating, Exercise and Nutrition Survey.*

Between 2000 and 2008, CalTEENS[13] found a considerable drop in the percentage of teens eating high-calorie, low-nutrient food, drinking regular sodas and sweetened beverages, and eating fast food. However, the percentage of youth who met the recommended number of fruits and vegetable servings dropped as well.

In 2008:

High-Calorie, Low-Nutrient Food

55.6% of teens reported eating 2 or more servings of pastries, fried foods, chips, desserts, candy, or sodas on a typical day, compared to 73.2% in 2000.

Soda

In 2008, nearly half (49.5%) of adolescents reporting having at least one soda or sweetened beverage on the previous day, compared to two-thirds (67.6%) in 2000, a percent decrease of 26.8%. The highest percentage of daily soda consumption in 2008 was by Hispanic/Latino teens (60.1%), followed by African American (54.1%), Asian/Other (43.3%), and white (39.8%).[a]

Fast Food

19.9% of teens reported having fast food on the previous day in 2008, compared to 28.2% in 2000.

Fruit and vegetable consumption

- 29.1% of 12-17 year olds reported eating the recommended minimum number of fruit and vegetable servings (5+ for girls and 7+ for boys) in 2008, compared to 34.7% in 2000, a 16% decrease.[14]

- In 2008, Latino youth had the highest percentage of meeting the recommendation (32.2%), followed by whites (28.8%), Asian/Other (26.9%), and African American teens (18.1%).[b]

- Nearly half (47.7%) of youth reported having no vegetables or salad, a slight improvement from 2000 when 51.0% reported eating no vegetables or salad on a typical day. In contrast, a higher percentage of youth (16.7%) had no servings of fruits or juices on the previous day in 2008, compared to 13.9% in 2000.

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[a] This difference was significant at the $p < .001$ level.

[b] This difference was significant at the $p < .05$ level.

California Children (9-11)

Information on the dietary practices of children (ages 9-11) comes from the *California Children's Healthy Eating and Exercise Practices Survey*.

Results from the 2009 CalCHEEPS interviews[15] found that:

- Compared to 1999,[16] a slightly lower percentage of 9-11 year olds were eating the recommended number of fruit and vegetable servings.
- Fewer children were eating high-calorie, low-nutrient food and fast food (see Table 3).
- Children's eating practices did not vary significantly among ethnic groups (see Table 4).

Table 3. Selected Eating Practices: Percent of California Children, Ages 9-11
California Children's Healthy Eating and Exercise Practices Survey, 1999 and 2009

On a typical school day:	**1999**	**2009**	**% Change**
4+ servings of high-calorie, low-nutrient food*	54.8	41.9	-12.9**
Fast food on a typical weekday	25.5	21.4	-15.7***
5+ servings of fruits and vegetables	20.1	18.6	-7.5 **** (ns)

*High-calorie, low-nutrient foods include high-fat snacks, sweets, and soda or sweetened beverages.
**Statistically significant decrease (p<0.001).
***Statistically significant decrease (p<0.05).
****Difference is not significant.

Source: California Department of Public Health. (February 2011). *California Children's Healthy Eating and Exercise Practices Survey, 2009 and 1999* [Data Tables 7, 39, 46]. Retrieved July 3, 2011, from: http://www.cdph.ca.gov/programs/cpns/Pages/2009CalCHEEPSDataTables.aspx and http://www.cdph.ca.gov/programs/cpns/Pages/1999CalCHEEPSDataTables.aspx

Table 4. Selected Eating Practices: California Children, Ages 9-11, by Race/Ethnicity
Percent Reporting Daily Consumption of
High-Calorie, Low Nutrient Food, Fast Food, and Fruits/Vegetables
California Children's Healthy Eating and Exercise Practices Survey, 2009

On a typical school day:	**4+ servings of high-calorie, low-nutrient food**	**Fast food**	**5+ Fruits/vegetables**
African American	50.3	20.7	25.7
Latino	39.7	24.4	18.4
Asian/Other	37.7	21.3	19.7
White	45.1	17.0	17.3
Total	41.9	21.4	18.6

*High-calorie, low-nutrient foods are high-fat snacks, sweets, and soda or sweetened beverages.

Source: California Department of Public Health. (February 2011). *California Children's Healthy Eating and Exercise Practices Survey, 2009 and 1999* [Data Tables 7, 39, 46]. Retrieved July 3, 2011, from: *http://www.cdph.ca.gov/programs/cpns/Pages/2009CalCHEEPSDataTables.aspx* and *http://www.cdph.ca.gov/programs/cpns/Pages/1999CalCHEEPSDataTables.aspx*

Infants and Younger Children

There is no survey with California-specific data about dietary habits of children under 9 years of age, with the exception of a national breastfeeding survey.

Breastfeeding has many known benefits for infants, children, and mothers. The American Academy of Pediatrics advises that breast milk alone is enough to support optimal growth and development for about the first 6 months after birth, and that it should be continued for at least the first year of life and then for as long as the mother and child desire.[17]

In 2007, the CDC administered the first national breastfeeding survey, entitled the Maternity Practices in Infant Nutrition and Care (mPINC), at all hospitals and birth centers in the United States.

Since 2007, there have been steady improvements in U.S. and California breastfeeding rates, compared to benchmarks set by *Healthy People 2010* and *Healthy People 2020*.

As shown in Table 5, California met or exceeded four of five *Healthy People* breastfeeding objectives in both 2007 and 2011.

Table 5. Percent of Breastfeeding, U.S. and California, 2007 and 2011

		2007			2011	
	HP 2010	**U.S.**	**California**	**HP 2020**	**U.S.**	**California**
Ever breastfed	75.0	73.8	**83.8**	81.9	74.6	**86.6**
Breastfeeding at 6 mo.	50.0	41.5	**52.9**	60.6	44.3	59.1
Breastfeeding at 12 mo.	25.0	20.9	**30.4**	34.1	23.8	**40.0**
Exclusive breastfeeding at 3 months	40.0	30.5	38.7	46.2	35.0	**48.1**
Exclusive breastfeeding at 6 months	17.0	11.3	**17.4**	25.5	14.8	**25.7**

Note: Percents in bold represent those that have met the Healthy People 2010 or 2010 objective.

Source: Centers for Disease Control and Prevention. *National Immunization Survey, 2004 births.* Centers for Disease Control and Prevention. National Immunization Survey, Provisional Data, 2008 births. Retrieved from http://www.cdc.gov/breastfeeding/data/reportcard.htm

APPENDIX A
Acronyms, Surveys & Methodologies

The statistical profiles in *Understanding Nutrition: A Primer on Programs and Policies in California* compile data from numerous surveys.

BRFSS: The *Behavioral Risk Factor Surveillance System* compiles national data from a system of state-administered, random-digit-dial phone interviews. The survey began in the late 1980's and uses standardized questions with individuals 18 and older.

CBRFSS: The *California Behavioral Risk Factor Surveillance System* analyzes BRFSS data and weights it to California Department of Finance demographic data to more accurately represent California's diverse population.

CDPS: The *California Dietary Practices Survey*, which began in 1989, is administered in odd-numbered years using a computer-assisted, random-digit-dial process to provide a representative sample of the adult 18+ population that have land-line telephones. Interviews are conducted in English and Spanish. Latino, African American, and low-income adults are oversampled to allow trend analysis among populations that are typically underrepresented.

CHIS: The *California Health Interview Survey* is a random-digit-dial telephone survey conducted every two years since 2001 that interviews 50,000 children, teenagers, and adults throughout the state on a wide range of health topics. It provides a detailed picture of the health and health care needs of California's large and diverse population. Many analyses are available at the county level.

CalTEENS: The *California Teen Eating, Exercise and Nutrition Survey,* operated since 1998, is a biennial telephone survey of partially random, digit-dialed and partially list-assisted 12-17 year olds in California, and the sample is weighted to the most recent state Department of Finance data.

CalCHEEPS: The biennial *California Children's Healthy Eating and Exercise Practices Survey* has used a demographically balanced market-research panel of households with 9-11 year olds since 1999. It includes a self-administered, parent-assisted mail survey and a follow-up telephone interview with a subset of the mail survey respondents.

mPINC: *Maternity Practices in Infant Nutrition and Care* is a national survey of maternity care practices and policies conducted by the Centers for Disease Control and Prevention that, beginning in 2007, has been conducted every 2 years. The survey is mailed to all facilities with registered maternity beds in the United States and Territories.

APPENDIX B

California Behavioral Risk Factor Surveillance System
Percent Adults 18+
Eating 5 or More Servings of Fruits and Vegetables Daily,
California, 2000 and 2009

	2000	2009	% change*
Total	27.4	28.6	4.4
GENDER			
Male	20.8	23.1	11.1
Female	33.8	34.0	0.6
RACE/ETHNICITY			
Asian/Other	31.9	32.6*	2.2
White	26.5	29.4*	10.9
African American	27.6	29.2*	5.8
Latino	26.7	25.0*	-6.4
AGE			
18-24	25.6	25.2	-1.6
25-34	23.9	26.5	10.9
35-44	24.9	27.1	8.8
45-54	26.7	30.0	12.3
55-64	26.6	29.3	10.1
65+	39.7	35.2	-11.3
INCOME			
<$15,000	29.9	24.6	-17.7
$15-24,999	27.2	30.1	10.7
$25-34,000	25.7	27.3	6.2
$35-49,999	22.8	28.1	23.2
$50-75,000	26.9	28.0	4.1
$75,000+	28.7	30.7	7.0

Note: Data are weighted to the 2000 California population (2010 data from the California Department of Finance were not available for this study).
*Differences in fruit and vegetable intake by race/ethnicity were statistically significant in 2009 (p value = 0.02, chi-square test).

Source: California Behavioral Risk Factor Surveillance System. Data analysis provided on June 7, 2011, by Suzanne Ryan-Ibarra, Public Health Institute, Survey Research Group, Cancer Surveillance and Research Branch, California Department of Public Health.

APPENDIX C

California Dietary Practices Survey
Percent Adults 18+
Eating 5 or More Servings of Fruits and Vegetables Daily,
California, 1997 and 2007

	1997	2007	% change*
Total	33	50	51.5
GENDER			
Male	30	47	56.7
Female	35	53	51.4
RACE/ETHNICITY			
Asian/Other	25 (1999)	59	34 (8 years)
White	33	51	18
African American	22	39	17
Latino	35	50	15
INCOME			
<$15,000	24	46	91.7
$15-24,999	34	50	47.1
$25-34,000	37	39	5.4
$35-49,999	33	50	51.5
≥$50,000	33	58	75.8
Food Stamp Participant	30 (2003)	44	46.7 (4 years)

Note: Data are weighted to the 2000 California population (2010 data from the California Department of Finance were not available for this study).
*Differences in fruit and vegetable intake by race/ethnicity were statistically significant in 2009 (p value = 0.02, chi-square test).

Source: S. Sugerman *et al*, California Adults Increase Fruit and Vegetable Consumption from 1997-2007, *Journal of Nutrition Education and Behavior 43 (4S2):* S96-103, 2011.

END NOTES

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For More Information

This data module on diet is one component of *Understanding Nutrition: A Primer on Programs and Policies in California*. Go to www.ccrwf.org to access additional primer modules.

Diane F. Reed, a long-time consultant with CCRWF, was the lead researcher for this module.

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