



# Adolescent Nutrition

## Introduction

Adolescence is the only time following infancy when the rate of physical growth actually increases. This sudden growth spurt is associated with hormonal, cognitive, and emotional changes that make adolescence an especially vulnerable period of life. First, there is a greater demand for calories and nutrients due to the dramatic increase in physical growth and development over a relatively short period of time. Second, adolescence is a time of changing lifestyles and food habits that affect both nutrient needs and intake. Third, adolescent drive for individuation means more opportunity to assert food choices and expand or narrow healthy options.

Adolescence can be divided into three stages. Early adolescence (11-14 years of age) is characterized by the onset of puberty and increased cognitive development. Middle adolescence (15-17 years of age) is characterized by increased independence and experimentation. Late adolescence (18-21 years of age) is a time for making important personal and occupational decisions.

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## California

### Nutrition and Physical Activity Guidelines for Adolescents

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## Common Nutrition Concerns

Adolescents of both sexes and in all income and racial/ethnic groups are at risk for dietary excesses and deficiencies. Dietary excesses of total fat, saturated fat, cholesterol, sodium, and sugar commonly occur. Most adolescents do not meet dietary recommendations for fruits, vegetables, and calcium-rich foods.<sup>1</sup> See Figure AN-1 for some factors that contribute to poor eating habits.

### Figure AN-1 Factors that Contribute to Poor Eating Habits

- Easily available, low-cost, high-fat and/or high-sugar, low-nutrient foods, such as French fries, candy, chips, or soda
- Limited access to healthy foods that appeal to adolescents
- Perception that healthy, low-in-fat, unprocessed, nutrient-dense foods (high in nutrients compared with their caloric content) are inconvenient and lack taste. Some examples of healthy snacks include fresh fruit, whole grain bread, or lowfat yogurt
- Lack of knowledge regarding appropriate nutrition and the health impact of poor nutrition
- Poor parental role modeling
- Lack of food shopping and preparation classes at school (e.g., home economics), resulting in the lack of relevant skills
- Increased incidence of disordered eating due to 1) fear of weight gain, 2) desire to build muscle mass, 3) to meet sports weight cut-offs, and 4) media and advertising messages

Some nutrition-related concerns for adolescents include consumption of sugar-sweetened beverages (SSBs), iron-deficiency anemia, inadequate calcium intake, unsafe weight-loss methods and eating disorders. Overweight and obesity in children and adolescents is generally caused by poor

eating habits and physical inactivity or a combination of the two.<sup>2</sup>

Nutrition problems may occur as a result of tobacco and alcohol use, pregnancy, disabilities, or chronic health conditions.

## Consequences of Poor Eating Habits

Poor or inappropriate dietary habits increase the risk and/or incidence of chronic disease among adolescents. Of great concern is the increasing rate of obesity and obesity-related health risks, such as diabetes and cardiovascular disease. The prevalence of type 2 diabetes among adolescents has increased and is closely linked to overweight and obesity.<sup>2</sup>

Inadequate iron intake increases the incidence of iron-deficiency anemia, especially among those adolescents at highest risk, such as pregnant adolescents, vegetarians, and competitive athletes. Vegetarianism is popular among some adolescents as they experiment or rebel and individuate. Without appropriate supplementation, these adolescents may be at risk for nutrient deficiencies (see the *Vegetarian Teens* section).

A typical adolescent diet does not include adequate amounts of fruit, vegetables, and grains.<sup>1</sup> These foods are a significant source of vitamins and minerals such as folate. Folate deficiency is a concern for all girls physically capable of becoming pregnant (see the *Folate/Folic Acid* section and *Fruits and Vegetables* section).

Consumption of SSBs (e.g. soda, vitamin water, sports drinks, energy drinks, Kool-Aid etc.) among

adolescents has risen dramatically and continues to replace milk and water.<sup>3</sup>

Health risks associated with this increased intake of sugar-sweetened beverages include excess sugar and caloric intake, which contribute to overweight, obesity and dental caries.



According to the American Academy of Pediatrics (AAP), most children and adolescents do not need to replace their electrolytes by drinking sports drinks. Their electrolyte needs are normally met by consuming a healthy and balanced diet. Water should be the beverage of choice. However, nonfat or lowfat milk can also be consumed after exercise.<sup>4</sup>

Due to their health risks, the AAP recommends that energy drinks should never be consumed by children and adolescents. Energy drinks and sports drinks are significantly different drinks with different risks. The fact that the terms are used interchangeably, possibly indicating confusion, is an additional concern.

One disturbing result of drinking SSBs is the decrease in milk consumption, resulting in insufficient calcium intake. Adequate calcium intake during adolescence is essential for peak bone mass, yet evidence suggests that most female adolescents do not meet the recommended daily intake.<sup>5</sup> Drinking soda may also interfere with calcium absorption due to high content of

phosphorus in soda. For more information, refer to the *Calcium* section.

## Nutrition Recommendations

For personalized nutrition recommendations based on age, sex, physical activity level, and other factors, visit the USDA's interactive [SuperTracker](#) website.

Although using the online tool is most convenient, food pattern tables can also be used. Refer to pages 78-82 of [The 2010 Dietary Guidelines for Americans](#). Some tables are included in Appendix A of this document.

### Energy

Carbohydrates, protein and fat provide energy in the form of calories.

Carbohydrates and protein each contain four calories per gram; fat contains nine calories per gram.

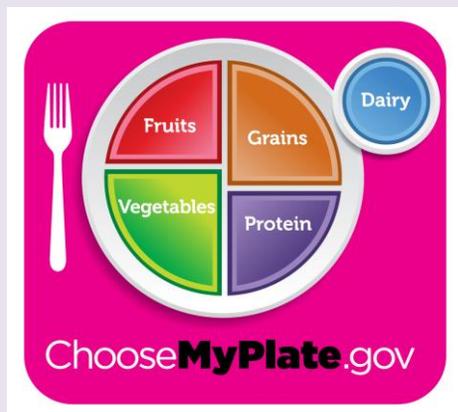
Non-pregnant and non-lactating female adolescents usually require between 1,600 and 2,400 calories each day. Adolescent males usually need about 1,800 to 3,200 calories. However, caloric needs vary by age and physical activity level. To identify calorie needs based on such factors, see Appendix A.

Of the total calories needed, about 60% is needed for the body's basic energy needs (basal metabolism). Some examples include tissue growth and repair as well as heart and lung function.

Pregnant and lactating adolescents generally have higher caloric needs. These needs depend on factors such as age, height, weight, and physical activity level. After entering in personal information, the [SuperTracker](#) website provides caloric recommendations for pregnancy and breastfeeding.

**Figure AN-2 MyPlate**

The MyPlate symbol and website, [www.choosemyplate.gov](http://www.choosemyplate.gov), were launched by the United States Department of Agriculture (USDA) in 2011. MyPlate serves as a reminder to eat healthfully and illustrates the five food groups using a familiar mealtime visual, a place setting. MyPlate encourages individuals to make healthier meal choices by building their plate like in the graphic below.



Each of the food groups depicted provides some, but not all of the nutrients that an individual needs. Foods in one group cannot replace foods from another group.

In addition to consuming healthy foods, daily physical activity is important for a healthy lifestyle.

MyPlate displays food proportions, not quantities. The recommended quantity of each food group varies from person to person based on age, sex, and other factors. For personalized recommendations, use the USDA's [SuperTracker](http://www.supertracker.gov) website or the tables included in Appendix A.

Resources that are available on the [ChooseMyPlate](http://www.choosemyplate.gov) and [SuperTracker](http://www.supertracker.gov) websites include:

- Daily food plans tailored to individuals of varying ages, beginning at age two
- A tool to access food information (food groups, calories and comparisons)
- A tracker that provides feedback on food and physical activity levels
- Planners that help in reaching personal goals

### Carbohydrates

Carbohydrates are an essential part of a healthy diet. They should not be eliminated from one's diet as part of a weight loss diet, such as the popular "no-carb diets." The best sources of carbohydrates are whole grains, fruits, vegetables, and beans. These are also excellent sources of vitamins, minerals, and fiber.

### Protein

Protein needs depend on the individual's rate of growth. Most adolescents meet or exceed recommended levels. Adolescents at risk for protein deficiency include strict vegetarians and those using extreme measures to restrict their food intake to lose weight.

### Fat

Fat is a necessary nutrient but most adolescents exceed recommended levels for fat intake.<sup>5</sup> Some adolescents, especially girls, are at risk for deficiency due to their efforts to lose or avoid gaining weight by severely reducing their fat intake. The USDA recommends that for adolescents aged 14-18 years, fat from all sources should be limited to 25%- 35% of all calories consumed that

day. Most fats given to adolescents should be unsaturated fats. Examples are fish, nuts, and vegetable oils.



## Vitamins and Minerals

Vitamins and minerals have a role in most or all processes that take place in the body. The demands of growth and development, coupled with poor eating habits, place many adolescents at risk for vitamin and mineral deficiencies, such as calcium and vitamin D (see Figure AN-3). Calcium requirements are higher for adolescents (see the *Calcium* section).

### Figure AN-3 Vitamin D

This vitamin is found in foods such as fortified milk, fish, eggs, and cod liver oil. Sunshine also contributes to vitamin D intake. Vitamin D is important for the body to build strong and healthy bones.<sup>6</sup>

For people aged 1-70 years of age, the Recommended Dietary Allowance is 600 IU of vitamin D per day, regardless of sex, pregnancy, or breastfeeding status.<sup>7</sup> If this recommendation is not met through foods and fortified milk, taking a vitamin D supplement may be recommended by their health care provider. Adolescents, especially those pregnant and breastfeeding should check with their primary healthcare provider before taking a vitamin supplement.

Adolescents who may become pregnant or are pregnant need to consume folic acid daily to help prevent birth defects

(see the *Folate* section). Adolescents who are pregnant have increased needs for certain vitamins and minerals. They should talk to their primary health care provider about taking a prenatal vitamin. See other sections for *Iron*, *Fruits and Vegetables*, and *Vegetarian Teens*.

## Fiber

Fiber is the non-digestible edible material found in fruits, vegetables, beans, and some grains, such as whole-grain cereal or oatmeal. Fiber helps with digestion and may reduce cholesterol levels. See Table AN-1 for recommended daily values.

**Table AN-1 Adequate Intake for Fiber (grams per day)**

Age	Females	Males
9-13	26	31
14-18	26	38
19-30	25	38
Pregnancy 14-18	28	
Pregnancy 19-30	28	
Lactation 14-18	29	
Lactation 19-30	29	

Source: Institute of Medicine, Food and Nutrition Board, 2005 <sup>9</sup>

Average fiber intake for female adolescents is approximately 13 grams per day,<sup>10</sup> which is well below recommended intakes. Fiber intake can be increased by consuming more fruits, vegetables, beans and whole grains.

To check if recommended daily intakes are met, an [interactive calculator](#) can be used.



## Water

Water is involved in almost every life-sustaining body process. It carries nutrients and oxygen to body cells, takes waste products away, and regulates body temperature. It provides no energy and thus has no calories.

The body loses water through urination, sweat, breathing, and feces. Drinking water and other beverages is the best way to replace body water. Solid foods, especially fruits and vegetables, also provide water, however this amount is difficult to measure.

When adolescents are physically active for less than three hours in mild weather conditions, only water is needed for re-hydration. However, if physical activity lasts longer than three hours and the weather is hot and humid, athletes may need to replace electrolytes, such as sodium, potassium, and chloride that help regulate the body's balance of fluids. When adolescents participate in prolonged physical activity, they should drink water; commercial sports drinks are rarely necessary. Salt pills should not be used, as they can be dangerous.

## Nutrition for Pregnancy & Breastfeeding

The USDA's [SuperTracker](#) website provides personalized nutrition recommendations during pregnancy and breastfeeding.

[MyPlate for Moms](#) (also available in [Spanish](#)) provides general nutrition recommendations for an average pregnant or breastfeeding woman\* (the document is available at the end of this section).



## Pregnancy

During pregnancy, there is a higher need for some vitamins and minerals. These can be obtained through eating healthy foods, such as fruits, vegetables, whole grains, etc. Use the [SuperTracker](#) website or [MyPlate for Moms](#) (also available in [Spanish](#)) to identify the quantity and types of foods to be eaten. A healthy diet plan should also be discussed with the primary healthcare provider.

**Vitamins:** Before and during pregnancy, folic acid must be consumed to help prevent certain birth defects (see the *Folate* section for details). A prenatal vitamin containing folic acid may be recommended during pregnancy. Vitamin, mineral and other supplements should be discussed with the primary

healthcare provider at prenatal visits. However, taking too much or giving them to someone else can be very dangerous. Vitamins should not replace a healthy diet.

**Alcohol:** Pregnant women and women who may become pregnant should not drink any alcohol. No amount of alcohol has been determined as safe during pregnancy. Drinks containing alcohol include beer, wine, liquor, and mixed drinks.

### Breastfeeding

Although similar to pregnancy, there are slight differences in nutrient requirements, which also vary by degree of breastfeeding. Use the [SuperTracker](#) website and [MyPlate for Moms](#) (also available in [Spanish](#)) to identify the quantity and types of foods to be eaten.

**Water:** As with everyone, while breastfeeding, one should drink to thirst. Most people get more thirsty while breastfeeding, so preparing a glass of water in advance is helpful. Drinking extra liquids does not produce more milk.

**Milk:** Drinking milk is not necessary for producing breast milk. Most mammals do not drink milk, but are capable of breastfeeding their young. Individuals who do not consume milk should have an alternate source of calcium. See the *Calcium* section for examples.

**Vegetarians:** Vegetarians are perfectly capable of producing quality breast milk and should breastfeed. Vegetarian diets should include alternate sources of protein, Vitamin B<sub>12</sub>, Vitamin D, and calcium.<sup>12</sup> Refer to the *Vegetarian Teens* and *Calcium* sections for examples.

See the *Physical Activity* section for physical activity recommendations for pregnancy or parenting.

## Adolescent Eating Behaviors

Adolescents spend a good deal of time away from home and many consume fast foods, which are convenient, but are often high in calories and fat. It is common for adolescents to skip meals and snack frequently. Some factors influencing adolescent food choices are described in Figure AN-4.

The California Department of Public Health conducts a dietary practices survey of 12- to 17-year-olds in California. It is called the California Teen Eating, Exercise and Nutrition Survey (CalTEENS). As part of this survey, Healthy Eating Practice Scores are analyzed. This score reflects fruit, vegetable, fiber, whole grain, and dairy consumption, in addition to low-fat dairy intakes. Scores range from potentially zero to a maximum of seven. In 2002, the average Healthy Eating Practice Score was approximately three out of seven for California adolescents (3.1 for females and 2.9 for males). The score for African-American adolescents was significantly lower than that of White adolescents at 2.6 (versus 3.1).<sup>13</sup>

### Figure AN-4 **Food Choices and Self-Regulation**<sup>11</sup>

Adolescents are provided with several different messages that may affect their daily food choices. In one study, researchers sought to understand the factors that influence the decision-making process of adolescents when it comes to food selection. Adolescents aged 11-18 years participated in a simulated task in which they chose particular items for a meal and then described why they chose particular foods.

Findings include:

- The primary reasons for adolescent food selection include: taste, familiarity/habit, health, dieting, and satiety.
- Adolescents reported eating a more healthy and varied meal at dinner.
- When adolescents made food choices, they followed self-made food decision-making rules to resolve conflicting values. Within a meal, “taste” was more influential for the core item, but “health” rose up in influence for the secondary or side item. When having lunch with peers, “taste” may be the primary reason for a food choice, but when with family at dinners, health may be more influential than it would be with peers.
- Other factors that influenced food selection are negotiation patterns within the family and interactions with peers.

When promoting healthy eating, educators should recognize the many dilemmas that adolescents face in making food choices. Educators can help adolescents eat healthy by providing guidance on: (1) developing food decisions, (2) effectively negotiating with family members and (3) appropriate peer interactions.

Approximately forty-eight percent of adolescents surveyed by the California Health Interview Survey (CHIS) in 2009\* reported eating at a fast food restaurant two or more times in the past week.<sup>14</sup> In 2006, 60.3% of California adolescents had eaten 2 or more servings of high-fat, low-nutrient foods the previous day.<sup>15</sup> On a positive note, adolescents who had been taught to cook in healthy ways reported more healthy eating practices.<sup>13</sup>

To encourage adolescents to learn how to prepare healthy foods, [recipes for adolescents](#) are available online.



### **Nutrition Supplements**

Dietary supplements may supply some vitamins and minerals, but they cannot provide all the nutritional components that food offers for good health. No supplement can fix an ongoing pattern of poor food choices.

Some adolescents may be intrigued by over-the-counter nutrition supplements such as vitamins, minerals, herbs and protein powders. The Food and Drug Administration (FDA) does not regulate the purity or dosages of most of these products, their claims are seldom proven, and overuse may be dangerous.

Expensive nutrition products — such as energy or power bars and shakes — are popular, but their effects on performance have not been widely studied and these

\* 12-17 years of age

may cause harm to adolescents. Creatine, a popular supplement among athletes, has not been evaluated for its effects on the growth, development, or health of adolescents.

### Cultural Factors

One's cultural background often influences one's food choices and preferences. People from different cultures may also view body weight differently. For example, some cultures may see excess weight as a sign of social status and health.

One's culture may also affect diet during pregnancy and infant feeding practices. Some cultures traditionally use herbal supplements and teas during pregnancy. These are not regulated and are not routinely recommended for use. See the *Infant Feeding* section for infant feeding recommendations.

Some cultures may also practice "good/bad" and/or "hot/cold" labeling of foods. According to this belief, certain foods cannot be eaten at certain times of the day or during a specific life stage (such as in pregnancy). If this is practiced, meal planning may be slightly more difficult, but plans can still be made.

Cultural influences are not limited to one's ethnic background. They can include religion, social and economic status, and where one was raised or currently lives (urban, rural, or suburban lifestyle). Adolescents also have their own culture that can strongly influence their food choices, especially away from home (see "Adolescent Eating Behaviors," earlier in this section).

For more information, refer to the following online resources:

- [Celebrating Diversity: Approaching Families through Food](#)
- [The California Food Guide](#) (also contains dietary information for several cultural groups in California)

The social pressure to be thin and the stigma of obesity can lead to unhealthy eating practices and poor body image, particularly among young female adolescents. Some adolescents, especially males, may want to build muscle mass. Their methods should be evaluated by their healthcare provider.



## What Can Case Managers Do?

### Suggested Interventions

Interventions planned to address adolescent nutrition and physical activity topics should include concrete, practical experiences that address immediate concerns. Although having accurate nutrition knowledge is important, especially for adolescents, it is very important to remember that knowledge alone is not enough to change dietary behavior.

Adolescents are more attentive to information if it is presented in an interactive way; they prefer not to simply

listen to a speaker or read a pamphlet or booklet. Education activities should be quick and fun, and should demonstrate that healthy foods are affordable, easy to prepare and can be flavorful.

### Encourage these eating practices:

- Drinking water or nonfat/lowfat milk when thirsty
- Eating with family members
- Selecting healthy foods when eating out
- Visiting farmers' markets if they are available in the community. Find a market using this [online search tool](#)
- Selecting fresh fruits and vegetables when they are in season and prices are lower
- Eating at fast food restaurants less frequently and learning to make healthier choices when doing so. Encourage reviewing nutritional content, as chain restaurants are required to have this information. It is unrealistic to expect adolescents to not frequent fast food restaurants
- Avoiding eating while watching TV or playing computer games

### Nutrition Screening

Case managers can screen their clients for nutrition risk (see the *Nutrition Risk Screening* section). They can provide education, offer nonjudgmental feedback on current habits, and recommend reasonable lifestyle changes. Concrete approaches are best. "Try a whole wheat bagel for breakfast" is clearer than "eat more grains," or "gradually switch from whole or lowfat milk to 1% or nonfat milk" is more concrete than "eat less fat." Using information gathered during the

screening process, case managers can assist clients to set goals and develop an action plan.

### Hands-on activities are very effective. Such activities include:

- Cooking demonstrations and food sampling
- Meal planning, including snacks and party foods
- Grocery store tours
- Planning a menu and shopping for ingredients within a limited dollar amount
- Tips on how to eat healthfully in restaurants
- Learning basic food preparation techniques using [recipes for teens](#)
- Serving healthy foods and providing a physical activity break. Use the resources available [here](#)
- Using applications ("apps") on phones to encourage healthy eating practices

### Goal Setting

Goals must be descriptive and concrete. They should be realistic, reasonable, and achievable. Avoid goals that are too ambitious or long term; make them small with short-term results.

It is important that the client chooses which goals are most important and realistic for her. Use [MyPlate for Moms](#) (also available in [Spanish](#)) to help the client identify nutrition goals that she would like to try.

### Referrals

Each section/guideline includes, when appropriate, recommendations for when and to whom referrals should be made.

## Web Links Referenced/Additional Resources

Title	Resource Type	URL
<b>SuperTracker</b>	Webpage - interactive tool	<a href="http://www.choosemyplate.gov/SuperTracker/createprofile.aspx">www.choosemyplate.gov/SuperTracker/createprofile.aspx</a>
<b>The Dietary Guidelines for Americans</b>	Document (PDF)	<a href="http://www.cnpp.usda.gov/Publications/DietaryGuidelines/2010/PolicyDoc/PolicyDoc.pdf">www.cnpp.usda.gov/Publications/DietaryGuidelines/2010/PolicyDoc/PolicyDoc.pdf</a>
<b>MyPlate for Moms</b>	Document (PDF)	<a href="http://www.cdph.ca.gov/programs/NutritionandPhysicalActivity/Documents/MO-NUPA-MyPlateForMoms.pdf">www.cdph.ca.gov/programs/NutritionandPhysicalActivity/Documents/MO-NUPA-MyPlateForMoms.pdf</a>
<b>MyPlate for Moms (Spanish)</b>	Document (PDF)	<a href="http://www.cdph.ca.gov/programs/NutritionandPhysicalActivity/Documents/MO-NUPA-SP_MyPlateHandout.pdf">www.cdph.ca.gov/programs/NutritionandPhysicalActivity/Documents/MO-NUPA-SP_MyPlateHandout.pdf</a>
<b>Fiber calculator</b>	Webpage - interactive tool	<a href="http://www.healthcalculators.org/calculators/fiber.asp">www.healthcalculators.org/calculators/fiber.asp</a>
<b>Celebrating Diversity: Approaching Families through Food</b>	Document (PDF)	<a href="http://www.mchlibrary.info/pubs/pdfs/CelebratingDiversity.pdf">www.mchlibrary.info/pubs/pdfs/CelebratingDiversity.pdf</a>
<b>California Food Guide: Fulfilling the Dietary Guidelines for Americans</b>	Webpage	<a href="http://www.dhcs.ca.gov/formsandpubs/publications/Pages/CFGTableofContents.aspx">www.dhcs.ca.gov/formsandpubs/publications/Pages/CFGTableofContents.aspx</a>
<b>California Food Guide: Fulfilling the Dietary Guidelines for Americans – Life Cycle: 9-18 Year Olds</b>	Document (PDF)	<a href="http://www.dhcs.ca.gov/dataandstats/reports/Documents/CaliforniaFoodGuide/12.9-18YearOlds.pdf">www.dhcs.ca.gov/dataandstats/reports/Documents/CaliforniaFoodGuide/12.9-18YearOlds.pdf</a>
<b>Recipes/cookbooks for adolescents</b>	Webpage	<a href="http://www.cdph.ca.gov/programs/NutritionandPhysicalActivity/Pages/EasyMealsandSnacks.aspx">www.cdph.ca.gov/programs/NutritionandPhysicalActivity/Pages/EasyMealsandSnacks.aspx</a>
<b>Farmers markets search tool</b>	Webpage - interactive tool	<a href="http://apps.ams.usda.gov/FarmersMarkets/">http://apps.ams.usda.gov/FarmersMarkets/</a>
<b>Worksite nutrition and</b>	Webpage -	<a href="http://www.cdph.ca.gov/HealthInfo/healthyliving/nutrition/Pages/WorksiteNutritionandPhysicalActivity.aspx">www.cdph.ca.gov/HealthInfo/healthyliving/nutrition/Pages/WorksiteNutritionandPhysicalActivity.aspx</a>

<b>physical activity</b>	<b>resources</b>	
<b>Nutrition and Physical Activity Initiative - Maternal, Child and Adolescent Health</b>	Webpage	<a href="http://www.cdph.ca.gov/programs/nutritionandphysicalactivity/Pages/default.aspx">www.cdph.ca.gov/programs/nutritionandphysicalactivity/Pages/default.aspx</a>
<b>Comprehensive website for adolescent girls' health</b>	Website	<a href="http://www.girlshealth.gov/">www.girlshealth.gov/</a>
<b>Los Angeles obesity campaign website</b>	Website	<a href="http://www.choosehealthla.com/">http://www.choosehealthla.com/</a>

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