

# **Obesity and Physical Inactivity Among Children and Adolescents in the San Joaquin Valley**



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# CENTRAL CALIFORNIA CHILDREN'S INSTITUTE

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# Executive Summary

Obesity is a risk factor for many health problems, regardless of a person's age. Children who are overweight, however, face a greater risk of health problems, including Type 2 diabetes, high blood pressure, high blood lipids, asthma, sleep apnea, and orthopedic problems, than do their non-overweight peers. They may also experience psychosocial problems, such as social stigma, discrimination, and low self-esteem. Overweight in children and adolescents can also be associated with medical care costs, which often extend into adulthood.

This report includes a study of factors that contribute to the understanding of the prevalence of overweight among children and adolescents in the San Joaquin Valley. Current literature related to childhood obesity was reviewed and publicly available data sets were used to study this problem. The 2001 California Health Interview Survey (CHIS) data on childhood obesity and related factors are featured in this report. These data were analyzed in relationship to age, gender, ethnicity, socioeconomic status, place of residence (urban vs. rural settings), and physical inactivity, including sedentary behaviors such as television viewing. Results for the San Joaquin Valley were also examined in relationship to state and national findings.

Based on the 2001 CHIS, almost one in eight or 40,000 adolescents ages 12-17 were overweight, and two out of three adolescents in the San Joaquin Valley did not participate in sufficient moderate physical activity. Differences existed between ethnic groups in both the prevalence of overweight and in physical inactivity patterns; Black and Latino adolescents had higher rates of overweight and higher rates of physical inactivity than did White adolescents. In addition, over one third of adolescents ages 12-17 in the Valley watched more than two hours of television per weekday. Furthermore, one in six overweight adolescents lived in the most impoverished households.

Data evaluated in this report indicate that the prevalence of overweight among children and adolescents is increasing at an alarming rate across the nation. The same holds true for the San Joaquin Valley. To ensure a healthier future for children and adolescents and address the magnitude of the problems associated with overweight in children and adolescents, immediate attention is needed and broad efforts in nutrition education, physical activity, and obesity prevention must be taken. This report includes recommendations for action and interventions that communities can implement.

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# Introduction

This report has four principal objectives: (1) to present an overview of childhood obesity and related factors that affect the health of children and adolescents who reside in the San Joaquin Valley; (2) to provide a basis for understanding this condition and its prevalence in the Valley; (3) to present relevant issues that require further investigation; and (4) to facilitate community discussions about regional data on childhood obesity. Various regional, state, and national sources of data on childhood obesity and physical inactivity have been used to summarize current knowledge about overweight among children and adolescents.

The prevalence of childhood overweight is increasing across the United States. Overweight children are at risk for health problems that can follow them into adulthood, such as Type 2 diabetes, high blood pressure, high blood lipids, asthma, sleep apnea, and orthopedic problems (Dietz & Robinson, 1998; U.S. Department of Health and Human Services, 2001). Overweight children are hospitalized more often than are children of healthy weight (Wang & Dietz, 2002), and it is estimated that 50% of overweight children remain overweight and obese as adults (Dietz & Robinson, 1998).

Health problems related to overweight in a child have been divided into three major categories (Must & Strauss, 1999). The first category of health problems includes the immediate health consequences, such as orthopedic abnormalities, asthma, sleep apnea, and gallstones. An increase in pediatric overweight appears to coincide with

an increase in childhood diabetes. Non-insulin-dependent diabetes reportedly increased 10 fold between 1982 and 1994, and more than 90% of new diagnoses were adolescent patients who were overweight (Pinhas-Hamiel et al., 1996).

The second category includes the progressive development of cardiovascular risk factors as the overweight child develops and grows. Studies have shown that overweight children are 9 to 10 times more likely to have high blood pressure in adulthood than are non-overweight children. This elevated blood pressure may start as early as 5 years of age (Must & Strauss, 1999).

The third category of health problems includes long-term complications, such as heart disease, atherosclerosis, colon cancer, arthritis, and general problems with daily living activities. It has been discovered that the relative risk of dying prematurely increased 1.5 to 2 times among individuals who were overweight as children, compared with individuals who were not overweight as children (Greger & Edwin, 2001; Must & Strauss, 1999).

In addition to physical health problems related to overweight and obesity, overweight children may also experience psychosocial problems, such as social stigma, discrimination, and low self-esteem. Children as young as 6 years of age ascribe negative terms to overweight peers, which can affect a child's body image and self-esteem (Must & Strauss, 1999).

Overweight and physical inactivity among children and adolescents are also associated with increased medical care costs, which can extend into adulthood. The annual hospital costs for overweight-related conditions in youths aged 6 to 17 years tripled, from \$35 million during 1979-1982 to \$127 million during 1997 (Wang & Dietz, 2002). Overweight and obesity are also associated with a 36% increase in inpatient and outpatient costs and a 77% increase in the cost of medications. Currently, the health care costs of obesity in adulthood far exceed the costs associated with smoking and problem drinking (Sturm, 2002; Wang & Dietz, 2002). In 2000, the total cost of overweight and obesity was estimated to be \$117 billion. (U.S. Department of Health and Human Services, 2002). The estimated cost of this condition in California alone is estimated at \$14.2 billion (U.S. Department of Health and Human Services, 2001).



# Terminology

The terms *body mass index (BMI)*, *obesity*, *at risk for overweight*, *overweight*, and *obese* are used throughout this report. They are generally used to describe body composition or the proportion of body mass to body fat. In this report, they are defined as follows:

**Body Mass Index (BMI)**—A ratio measurement of weight to height that is used to categorize children as underweight, normal, at risk for overweight, or overweight, defined as the weight in kilograms divided by the height in meters squared (Centers for Disease Control and Prevention [CDC], 2004b).

**Obesity**—Refers to an excessively high amount of body fat or adipose tissue in relation to lean body mass (Skunkard & Wadden, 1993).

**Overweight**—Age- and gender-adjusted BMI at or above the 95<sup>th</sup> percentile (CDC, 2004b).

**At risk for overweight**—Age- and gender-adjusted BMI above the 85<sup>th</sup> and below the 95<sup>th</sup> percentile (CDC, 2004b).

**Obese**— For children and adolescents, the terms obese and overweight are synonymous, meaning that both these terms are defined by age- and gender-adjusted BMI at or above the 95<sup>th</sup> percentile. Among children and adolescents, even though overweight roughly corresponds to the obese BMI range for adults (Diamant, Babey, Brown, & Chawla, 2003), potentially negative connotations associated with the term “obesity” make “at risk for overweight,” and “overweight” the preferred scientific terms when referring to young people whose excess body weight poses medical risks (CDC, 2004c).



# Methodology

## Data Sources

This report uses secondary data and prevalence estimates about childhood overweight and physical inactivity from the 2001 California Health Interview Survey (2001 CHIS; UCLA Center for Health Policy Research, 2004). The 2001 CHIS was a telephone survey of California communities that was conducted in six languages by the Center for Health Policy Research at the University of California, Los Angeles School of Public Health between November 2000 and September 2001. Households with children ages 0-17 in the San Joaquin Valley and other communities in the state were randomly selected. Telephone interviews were conducted with the adult who had the most knowledge about the child under age 12 about whom data were being gathered, as well as one adolescent age 12-17, if living in the same household. Responses to questions about weight and height and other health conditions and behaviors were collected during these interviews.

These responses were used to calculate county-level estimates for the prevalence of overweight in the eight counties of the San Joaquin Valley, Fresno, Kern, Kings, Madera, Merced, San Joaquin, Stanislaus, and Tulare. The tables and figures in this report contain estimates of the extent of overweight and physical inactivity from the 2001 CHIS and other data sources.

The report examined several secondary sources of data other than the 2001 CHIS. This section defines and describes the interview and survey databases that are referred to in the report and the methods used to collect these data. A summary of criteria for overweight or obesity and comments on how the data from each source compares to 2001 CHIS data are presented in Table 1, followed by a description of the databases.

**Table 1**  
**Criteria for At Risk for Overweight and Overweight**

Data Source	Criteria for At Risk for Overweight	Criteria for Overweight	Comparison to 2001 CHIS Criteria
FITNESSGRAM®	Above the Healthy Fitness Zone for Body Composition*	Above the Healthy Fitness Zone for Body Composition*	Different
CalTEENS	85-94 <sup>th</sup> Percentile of Age-Gender BMI	At and above 95 <sup>th</sup> Percentile of Age-Gender BMI	Same
NHANES	85-94 <sup>th</sup> Percentile of Age-Gender BMI	At and above 95 <sup>th</sup> Percentile of Age-Gender BMI	Same
PedNSS	85-94 <sup>th</sup> Percentile of Age-Gender BMI	At and above 95 <sup>th</sup> Percentile of Age-Gender BMI	Same
CDC	85-94 <sup>th</sup> Percentile of Age-Gender BMI	At and above 95 <sup>th</sup> Percentile of Age-Gender BMI	Same

*\*The Healthy Fitness Zone for Body Composition is calculated based on BMI and skin fold thickness.*

**FITNESSGRAM®.** The 2001 FITNESSGRAM® data were collected by the California Department of Education and analyzed by the California Center for Public Health Advocacy (2002). The FITNESSGRAM® is a database of variables assessing physical performance and body composition for fifth, seventh, and ninth graders.

Data were collected by classroom teachers in 6,837 schools, and the results were categorized according to state assembly district. The FITNESSGRAM® defined overweight as any score that was above the Healthy Fitness Zone for Body Composition. This definition varies from that of the CDC, which determines overweight based

on BMI. The FITNESSGRAM study determined fitness by measuring the child's aerobic capacity, using running and walking tests.

***California Teen Eating and Exercise Nutrition Survey (CalTEENS).*** The CalTEENS is a random-digit-dial telephone survey regarding nutrition and exercise among adolescents in the State of California. The survey collected and analyzed data on a representative sample of California adolescents ages 12-17. Adolescents were interviewed using a simple structured 24-hour recall survey that identified nutritional intake, physical activity habits, height, weight, and television viewing behavior. The survey began in 1998 and is conducted every two years. The data used in this report comes from the 1998 CalTEENS survey, which included 1,213 randomly selected 12- to 17-year-olds (Foerster et al., 2000).

***National Health and Nutrition Examination Survey (NHANES).*** The NHANES is an annual survey conducted by the National Center for Health Statistics for the Centers for Disease Control. The sampling plan was designed to provide estimates representative of the U.S. population. The NHANES provided nationally representative data to estimate the prevalence of major diseases, nutritional disorders, and potential health risk factors. The survey procedure included a home interview and a standardized physical examination. Trained technicians measured the participants' body weight and height with standardized equipment and procedures. Beginning in 1999, NHANES became a continuous survey. The data used in this report is drawn from the results of the 1999-2000 NHANES reported by Ogden, Flegal, Carroll, and Johnson (2002) and is based on the responses and measurements of 4,722 children ages birth through 19 years.

***Pediatric Nutrition Surveillance System (PedNSS).*** The PedNSS is a child-based public health surveillance system that monitors the nutritional status of low-income children in federally funded maternal and child health programs. Data for more than 5 million children are collected at public health clinics and then collated at the state level and submitted to the CDC for analysis. This report uses data from the 2001 PedNSS which includes children enrolled in the following federally funded programs: Special Supplemental Nutritional Program for Women, Infants and Children (WIC), Early and Periodic Screening, Diagnosis

and Treatment (EPSDT) Program, Title V Maternal and Child Health Program, and Head Start program, among others. Other sources of information not reflected in Table 1 were also used for this report. They do not appear in Table 1 because they do not use the BMI as a unit of measure:

***Youth Risk Behavior Surveillance System (YRBSS).*** The YRBSS includes national, state, and local school-based surveys of representative samples of 9<sup>th</sup> through 12<sup>th</sup> grade students. The YRBSS includes a survey, entitled the *Youth Risk Behavior Survey (YRBS)*, administered by the CDC every two years. The YRBSS surveys were developed in 1990 to monitor priority health-risk behaviors that contribute markedly to the leading causes of death, disability, and social problems among youth in the United States. Students completed a self-administered questionnaire during one class period and recorded their responses in a booklet or on an answer sheet that was then scanned by computer. This report uses findings from the 2001 YRBSS, which included 13,601 students nationwide.

***California Children Healthy Eating and Exercise Practiced Survey (CalCHEEPS).*** The CalCHEEPS survey was administered by the California Department of Health Services in conjunction with the Public Health Institute. It was administered to identify dietary and physical activity practices, knowledge, and attitudes toward nutrition and physical activity among California children. In 1999, the survey was mailed to California households with children ages 9-11. Follow-up telephone calls were made to households selected to receive the survey, and parents were requested to keep a two-day diet and physical activity diary for their children. The sample for the 1999 CalCHEEPS survey totaled 814 participants.

***National Longitudinal Study of Adolescent Health (Add Health).*** Add Health is a longitudinal study involving a nationally representative, school-based sample of 17,766 adolescents in grades 7-12 (ages 11-21) in the United States. In-school surveys and in-home surveys of adolescents provided data about the physical activity of the respondents. In-home surveys of parents provided income, educational, and other socio-demographic data (Gordon-Larsen, Popkin, & McMurray, 2000).

## **Measurement Issues in Overweight and Obesity**

The scientific literature on overweight and obesity reflects a wide range of criteria and definitions used to assess overweight and obesity in children and adolescents. Likewise, various techniques used to assess body composition are also reported in the literature.

The technique most often employed by health care practitioners is the Body Mass Index (BMI), because it represents a ratio of weight to height. In children and adolescents, body dimensions change over the years as they grow. Girls and boys also differ in their ratio of weight to height as they mature (Hammer, Kramer, Wilson, Ritter & Dornbusch, 1991). This is why BMI for children, also referred to as BMI-for-age, is gender and age specific (CDC, 2004b). BMI-for-age is evaluated using percentile cutoff points to compare values for a given child with values for other children of the same age and gender from a national reference sample (CDC, 2004c).

Although the use of BMI as an accurate assessment of body composition among adults is controversial, its use among children and adolescents is considered appropriate. An adult with an exceptional amount of muscle mass may be categorized as obese simply because his or her weight-to-height ratio would be higher compared to the ratio of a person with less muscle mass. Although BMI is not a perfect method for assessing body composition among adults, it has been reported as a scientifically valid measure for estimating body fat in children. Values obtained from the BMI are comparable to values obtained using more precise yet relatively inaccessible techniques, such as dual energy x-ray absorptiometry (DEXA) (Dietz & Robinson, 1998; Pietrobelli et al., 1998). Furthermore, BMI can be interpreted using gender- and age-specific percentile standards for persons up to age 20. BMI tables were developed by the National Center for Health Statistics and are available from the CDC (2004a).

### **Data Limitations**

The 2001 CHIS was conducted using a random sample of the San Joaquin Valley population. The numbers and percentages presented in this report are therefore weighted estimates of the prevalence of overweight and physical inactivity among children and adolescents ages 0-17. When relatively small numbers of survey participants are used to generate population estimates, some error is al-

ways introduced. To mitigate the effects of such sampling bias, CHIS researchers used special weighting procedures. However, in some cases, the level of potential error is such that the estimate is unavailable or is considered unstable. In some instances in this report, unstable estimates are presented along with stable estimates for the purpose of comparison among groups of data. The authors recognize this limitation of the data presented and encourage the reader to use caution in interpreting estimates and percentages identified as unstable.

The authors also recognize the potential bias of the self-report data for the 2001 CHIS, as well as for the other surveys examined in this report. The reliability and validity of self-report data as it relates to height and weight impacts studies of the prevalence of overweight and obesity. Surveys, such as the CHIS, rely on self-reported information that is generally gathered during personal interviews, telephone interviews, and mail questionnaires. Although self-report data are certainly better than no data at all, several studies have suggested that self-report data as they relate to height and weight, as well as physical activity habits, are generally unreliable. Most studies of this nature have reported that height is over-reported and weight is under-reported (e.g., Goodman, Hinden, & Khandelwal, 2000; Roberts, 1995; Rowland, 1990; Wang, Patterson, & Hills, 2002). Thus, the calculation of BMI based on self-report contributes to bias and ultimately the underestimation of the prevalence of overweight and obesity (Roberts, 1995). Also, bias in self-reports of weight and height is much more extensive among overweight and obese individuals than it is among normal or underweight individuals (Goodman et al., 2000; Rowland, 1990; Wang et al., 2002). These findings have been reported for both adolescent and adult samples (Goodman et al., 2000; Roberts, 1995; Rowland, 1990; Wang et al., 2002).

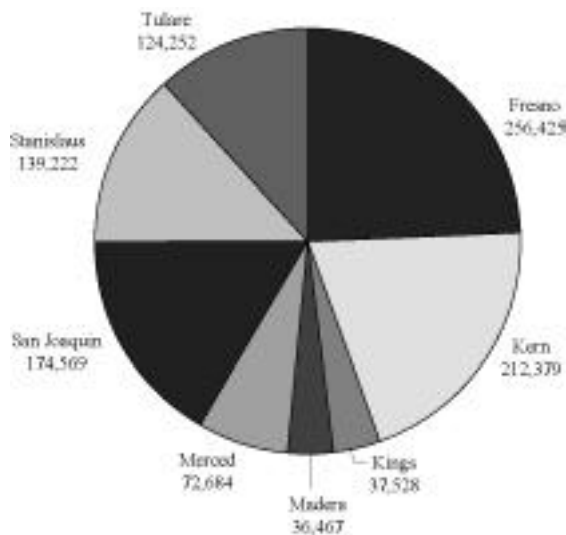
Despite the varying criteria used in reports or the inherent biases of self-reported responses, the data suggest that there is a significant problem in regard to the prevalence of overweight among children and adolescents. Furthermore, regardless of the tools used to collect the information, every report addressing the issue of overweight and obesity across the nation has concluded that today's children and adolescents are much more overweight than were children and adolescents from previous generations.

## Characteristics of the San Joaquin Valley

The San Joaquin Valley is comprised of an area in Central California extending over 27,000 square miles, with a rapidly growing population that exceeds 3.2 million people (U.S. Census Bureau, 2003d). Approximately one million

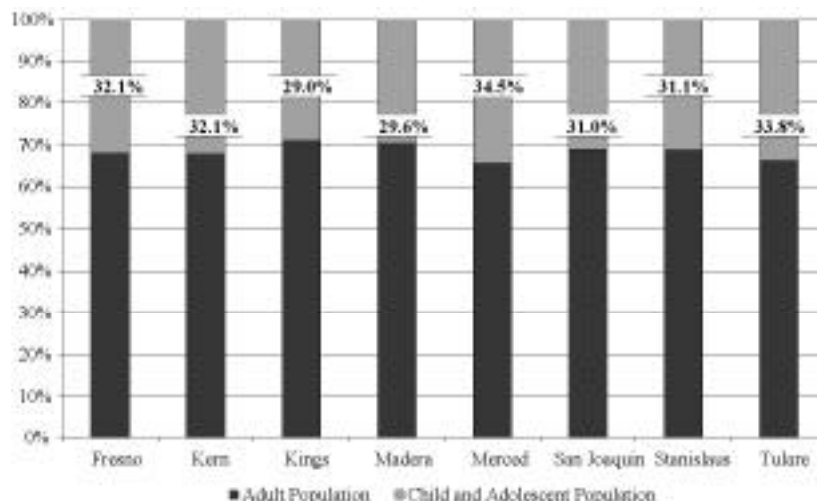
children under the age of 18 live in the San Joaquin Valley (see Figure 1), representing approximately one third of the population within each county in the San Joaquin Valley region (see Figure 2; U.S. Census Bureau, 2003c).

**Figure 1**  
San Joaquin Valley Child and Adolescent Population, Ages 0-17, 2000



Source: U.S. Census Bureau, Census 2000 (2003c)

**Figure 2**  
San Joaquin Valley Child and Adolescent Population Ages 0-17 as a Percentage of Total Population, 2000

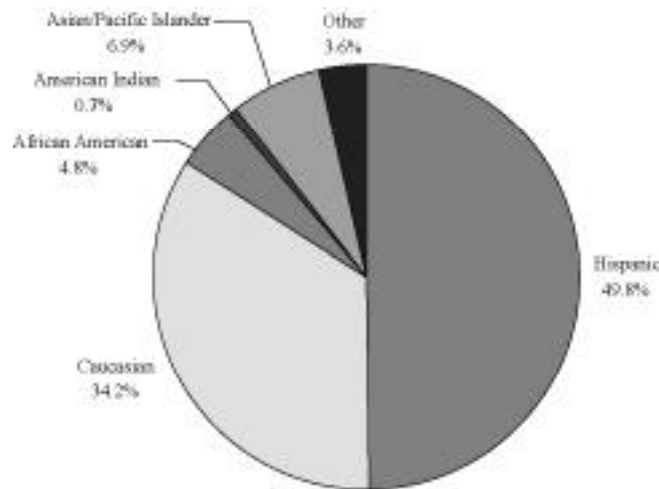


Source: U.S. Census Bureau, Census 2000 (2003c)

The San Joaquin Valley is one of the most culturally and ethnically diverse areas in the nation and research evidence suggests that overweight is more common among specific population subgroups. For example, national data indicate that between 1986 and 1998, overweight increased significantly and steadily among children, regardless of race. However, overweight increased faster and more

prominently among African American children (22%) and Hispanic children (22%), as compared to non-Hispanic White children (12%, Strauss & Pollack, 2001). Thus, the ethnic diversity in the San Joaquin Valley may contribute to the obesity problem within this region. Figure 3 illustrates the racial and ethnic diversity of the children and adolescents in the San Joaquin Valley.

**Figure 3**  
**Race/Ethnicity of Children and Adolescents Ages 0-17 in the San Joaquin Valley, 2000**



Source: U.S. Census Bureau, Census 2000 (2003b)

In the San Joaquin Valley, one quarter to one third of children ages 0-17 live in poverty (U.S. Census Bureau, 2003a). It has been suggested that socioeconomic status can be a predictor of overweight in childhood. Several reports have provided data that indicated an inverse relationship between socioeconomic status and childhood obesity. In other words, children from poorer families tend to be overweight at a higher rate and are at a higher risk for becoming overweight than are children from wealthier families. Furthermore, these data indicate that socioeconomic status affects other factors related to childhood overweight, such as nutritional intake and physical activity habits (DeLany, Bray, Harsha, & Volaufova, 2002; Kimm, Gergen, Malloy, Dresser, & Carroll, 1990; Laitinen, Power, & Jarvelin, 2001; McMurray et al., 2000). Socioeconomic status and its impact on childhood overweight are discussed in more detail later in this report.

### School Nutrition

Research evidence has shown that poor diet and physical inactivity play important roles in child weight gain (Berkey et al., 2000; Rowlands, Eston, & Ingledew, 1999). For example, meals provided through the National School Lunch Program are required by law to be balanced and nutritious. However, on average, meals offered by this program and the School Breakfast Program have been shown to exceed the dietary guidelines for total fat and saturated fat as a percentage of food energy (Ritchie et al., 2001). In California, 16% of 9- to 11-year-olds reported having access to vending machines at school that sold either soda or candy and 8% reported having access to vending machines that sold chips or cookies (Public Health Institute, 2001). Furthermore, children who were at risk for overweight and who were overweight were twice as likely to attend a school with vending machines selling chips and candy and reported eating more fast foods compared with children who were not overweight (Public Health Institute, 2001).



## Age, Gender, and Overweight

Data from the NHANES show that the prevalence of overweight among children ages 6-11 increased nearly 4 times, from 4% to 15% between 1963 and 2000. Between 1966 and 2000, the prevalence of overweight among adolescents ages 12-19 increased from 5% to 16% (Ogden et al., 2002). The increase in the prevalence of overweight among children within the State of California reflects the national trend.

According to the CalTEENS study, in 1998, 31% of adolescents aged 12-17 were overweight or at risk for becoming overweight. When categorized by gender, a greater percentage of males than of females were either overweight or at risk for overweight, meaning over one in three adolescent males and one in four adolescent fe-

males were overweight or at risk for overweight (Foerster et al., 2000). Similar statistics were found in other sources. According to the 2001 FITNESSGRAM®, there was a high rate of overweight and unfit children in all 80 Assembly Districts in California, and the rate of overweight boys (31.8%) was higher than that of overweight girls (21%). Furthermore, PedNSS data show that the percentage of overweight children in the state increased from 12.4% to 14.1% between 1990 and 1998 (CDC, 2000). These findings are mirrored in the 2001 CHIS data (UCLA Center for Health Policy Research, 2004). Table 2 shows gender differences in the prevalence of adolescent overweight in the San Joaquin Valley as compared to California as a whole.

**Table 2**  
**Overweight Among Adolescents Ages 12-17 by Gender, 2001**

	Male	Female	Total
<b>San Joaquin Valley</b>			
Number	28,000	11,000	40,000
Percent	16.9%	7.2%	12.2%
Total	168,000	157,000	325,000
<b>California</b>			
Number	217,000	102,000	319,000
Percent	15.0%	7.5%	11.4%
Total	1,448,000	1,362,000	2,810,000

*Note:* Totals are estimates which may vary due to rounding.

*Source:* 2001 CHIS (UCLA Center for Health Policy Research, 2004)

## Ethnicity and Overweight

It has been suggested that certain subgroups of the population are at a higher risk for overweight and obesity than are others. Although data on ethnic differences related to obesity and physical inactivity are inconclusive, there is a consensus that obesity rates are higher among African Americans and Latinos than among Whites (U.S. Department of Health and Human Services, 2000).

The relationship between ethnicity and overweight among children and adolescents has also been identified by several sources. Using NHANES data, Ogden et al. (2002) found that over one in three non-White children ages 6-11 were identified as overweight or at risk for overweight.

The 1988 CalTEENS survey (Foerster et al., 2000) reported that nearly one in three Latino adolescents aged 12-17 and one in two African American adolescents in the same age range were identified as overweight or at risk for overweight. Similar results were found by the California Center for Public Health Advocacy and in the CalCHEEPS study (Public Health Institute, 2001) among elementary and secondary school-aged children and adolescents.

The estimates of childhood overweight among ethnic groups reported by these sources differ from 2001 CHIS data (see Table 3).

**Table 3**  
**National and State Overweight Rates Among Children and Adolescents**

	<b>NHANES, 1999-2000 (National)</b>	<b>CalTEENS, 1998 (State)</b>	<b>CalCHEEPS, 1999 (State)</b>	<b>FITNESSGRAM®, 2001 (State)</b>	<b>CHIS, 2001 (State)</b>	<b>CHIS, 2001 (SJV)</b>
African American	36%	50%	38%	28.6%	18.0%	23.6%*
American Indian					10.0%*	--
Asian					6.8%	10.2%*
Latino/Mexican American	39%	36%	34%	33.7%	13.1%	12.6%
White	26%	25%	29%	20.2%	10.0%	10.6%

\*Statistically unstable estimate

--Not available

Note. SJV = San Joaquin Valley; Groupings of ethnicity vary by survey. For example, NHANES uses the term non-Hispanic Black, whereas all other sources use the term African American; Percentages are for varying age groups.

### **Socioeconomic Status and Overweight**

Socioeconomic status (SES) is another factor that has been identified as a predictor of childhood overweight in the scientific literature. Several studies have reported an increased relationship between SES and childhood overweight (DeLany et al., 2002, Kimm et al., 1990, U.S. Department of Health and Human Services, 2000). When comparing California data to national data, PedNSS reported that 14% of low-income California children under the age of 12 were overweight compared to 11% of low-income children of the same age nationally (CDC, 2000).

In this report, SES is discussed in terms of household income in relation to the federal poverty level (FPL). In the San Joaquin Valley, almost one in five overweight adolescents aged 12-17 lived in a household with an income at 200-299% of the FPL. The next highest percentage of adolescents who were overweight came from the most impoverished households in the San Joaquin Valley (0-99% FPL; see Table 4).

**Table 4**  
**Overweight Among Adolescents Ages 12-17 by Federal Poverty Level, 2001**

	<b>0-99% FPL</b>	<b>100-199% FPL</b>	<b>200-299% FPL</b>	<b>300% FPL and above</b>	<b>Total</b>
<b>San Joaquin Valley</b>					
Number	13,000	8,000	11,000	8,000	40,000
Percent	13.6%	10.8%	18.5%	8.3%	12.2%
Total	94,000	75,000	58,000	97,000	325,000
<b>California</b>					
Number	89,000	70,000	48,000	112,000	319,000
Percent	15.3%	12.1%	11.4%	9.1%	11.4%
Total	580,000	583,000	420,000	1,226,000	2,810,000

Note: Totals are estimates which may vary due to rounding.

Source: 2001 CHIS (UCLA Center for Health Policy Research, 2004)

It is possible that the food choices of those who are not able to afford enough food for their households can result in diets that are higher in fat and nutrient-deficient. According to the 2001 CHIS, when questioned about their ability to afford food, 35% of San Joaquin Valley adults who lived in households with incomes below 200% of the FPL stated they were not able to afford enough food (UCLA Center for Health Policy Research, 2004).

It has been suggested that when households do not have enough money to pay for food, or when food stamps run out before the end of the month, there can be an increased reliance on foods high in fat, or foods without adequate nutrients, which may result in weight gain over time. Furthermore, it has been reported that, while total caloric

intake decreased for children from food-insecure households, the proportion of calories from fat and saturated fat increased. This finding did not appear among children from food-secure households (Ritchie et al., 2001).

### Place of Residence and Overweight

Data on the prevalence of overweight among children and adolescents living in urban settings versus those living in rural settings are limited. In the San Joaquin Valley, the rates of overweight children did not differ by the location of the child's place of residence. Table 5 shows that 1 out of 10 children in the San Joaquin Valley is overweight, both in rural and in urban settings. These percentages are comparable to those of the state.

**Table 5**  
**Overweight Among Adolescents Ages 12-17 by Place of Residence, 2001**

	Urban	Rural	Total
<b>San Joaquin Valley</b>			
Number	27,000	13,000	40,000
Percent	11.9%	12.9%	12.2%
Total	225,000	99,000	324,000
<b>California</b>			
Number	269,000	50,000	319,000
Percent	11.2%	12.7%	11.4%
Total	2,410,000	396,000	2,806,000

*Note:* Totals are estimates which may vary due to rounding.

*Source:* 2001 CHIS (UCLA Center for Health Policy Research, 2004)

### Role of Physical Inactivity

Regular physical activity throughout life is important for maintaining a healthy body, enhancing psychological well-being, and preventing premature death (U.S. Department of Health and Human Services, 2000). Among individuals of any age, lower death rates are associated with regular physical activity, even if performed at a moderate level. A reduced risk of developing diabetes, dying from heart disease, and developing hypertension are all attributed to regular physical activity (U.S. Department of Health and Human Services, 2000).

The amount of time U.S. children and adolescents spend in physical activity has decreased over the past few decades, whereas the amount of time they spend in sedentary behaviors, such as television watching and video-

game-playing, has increased (Sternfeld et al., 1999). Research has also shown that with an increase in age, there is a decline in the levels of physical activity (Sternfeld et al., 1999). Furthermore, studies have shown that among adolescent males and females, a higher caloric intake and more time spent in sedentary activities, such as television viewing, were associated with larger increases in BMI (Berkey et al., 2000).

Physical fitness includes a set of physical attributes that allow the body to respond or adapt to the demands and stress of physical effort. Components of physical fitness that are most closely related to health include aerobic fitness, muscular endurance, muscular strength, flexibility, and body composition (Fahey, Insel, & Roth, 2001). Physi-



cal activity leads to many kinds of physical fitness (e.g., flexibility, muscle strength and endurance, cardiovascular fitness, and body composition), depending on the type of activity. Cardiovascular endurance is the component most strongly correlated with body composition. Adolescents with lower levels of cardiovascular endurance tend to have a higher proportion of fat than of lean body mass (Berkey et al., 2000).

In the 2001 YRBS and the 2001 CHIS surveys, sufficient vigorous physical activity was defined as any activity that lasts for at least 20 minutes at a minimum of three days per week and causes sweating and heavy breathing. Sufficient moderate physical activity was defined as any activity that lasts for at least 30 minutes at a minimum of five days per week that does not result in sweating or heavy breathing, such as slow biking or walking. Household chores such as sweeping and mopping are also included in this category (CDC, 2001; UCLA Center for Health Policy Research, 2003). Data from the 2001 YRBS

indicated that over one in three students (35.5%) surveyed nationwide had not participated in sufficient vigorous physical activity (CDC, 2001). Findings from the 2001 CHIS regarding levels of vigorous physical activity among children and adolescents in the San Joaquin Valley are similar to the national findings from the 2001 YRBS. According to the 2001 CHIS, one in three (38.3%) adolescents ages 12-17 in the Valley did not participate in sufficient vigorous physical activity (UCLA Center for Health Policy Research, 2003).

The 2001 CHIS and the 2001 YRBS differed on the findings on moderate physical activity. Based on the 2001 CHIS, two in three (65%) (UCLA Center for Health Policy Research, 2004) adolescents in the San Joaquin Valley reported not engaging in sufficient moderate physical activity compared to 74.5% adolescents across the nation (CDC, 2001). Comparison of physical inactivity percentages in the Valley and in the state are reflected in Tables 6 and 7.

**Table 6**  
**Adolescents Ages 12-17 Not Engaging in Sufficient Vigorous Physical Activity, 2001**

	<b>Number</b>	<b>Percentage</b>	<b>Total</b>
San Joaquin Valley	133,000	38.3%	348,000
California	1,074,000	36.4%	2,949,000

*Note:* Totals are estimates which may vary due to rounding.

*Source:* 2001 CHIS (UCLA Center for Health Policy Research, 2004)

**Table 7**  
**Adolescents Ages 12-17 Not Engaging in Sufficient Moderate Physical Activity, 2001**

	<b>Number</b>	<b>Percentage</b>	<b>Total</b>
San Joaquin Valley	228,000	65.5%	348,000
California	1,993,000	67.8%	2,941,000

*Note:* Totals are estimates which may vary due to rounding.

*Source:* 2001 CHIS (UCLA Center for Health Policy Research, 2004)

Physical inactivity takes on another dimension when examined by gender. According to the 2001 CHIS, one third of adolescent males ages 12-17 (32.2%) living in San Joaquin Valley did not engage in sufficient vigorous physical activity. The percentage of females of the same age who did not engage in sufficient vigorous physical activity was higher at 44.9%. Percentages for both male and female adolescents in the San Joaquin Valley who did not

engage in sufficient vigorous physical activity were higher than were those for male and female adolescents at the state level. Moderate physical inactivity patterns among males in the Valley were higher than were those among females, and the percentages were slightly lower in the San Joaquin Valley than they were at the state level (see Tables 8 and 9).

**Table 8**  
**Adolescents Ages 12-17 Not Engaging in Sufficient Vigorous Physical Activity by Gender, 2001**

	<b>Male</b>	<b>Female</b>	<b>Total</b>
<b>San Joaquin Valley</b>			
Number	58,000	75,000	133,000
Percent	32.2%	44.9%	38.3%
Total	181,000	167,000	348,000
<b>California</b>			
Number	444,000	630,000	1,074,000
Percent	29.3%	44.0%	36.4%
Total	1,516,000	1,434,000	2,949,000

*Note:* Totals are estimates which may vary due to rounding.

*Source:* 2001 CHIS (UCLA Center for Health Policy Research, 2004)

**Table 9**  
**Adolescents Ages 12-17 Not Engaging in Sufficient Moderate Physical Activity by Gender, 2001**

	<b>Male</b>	<b>Female</b>	<b>Total</b>
<b>San Joaquin Valley</b>			
Number	123,000	104,000	228,000
Percent	68.3%	62.4%	65.5%
Total	181,000	167,000	348,000
<b>California</b>			
Number	1,060,000	933,000	1,993,000
Percent	70.2%	65.2%	67.8%
Total	1,511,000	1,430,000	2,941,000

*Note:* Totals are estimates which may vary due to rounding.

*Source:* 2001 CHIS (UCLA Center for Health Policy Research, 2004)

Significant differences in physical inactivity patterns have also been reported among ethnic and racial groups. In general, African American and Hispanic adolescents are less physically active than are White adolescents (U.S. Department of Health and Human Services, 2000). According to the 2001 YRBS, Hispanic and Black students (60.5% and 59.7%, respectively) were less likely to report sufficient vigorous physical activity than were White students (66.5%; CDC, 2001). Similarly, Gordon-Larsen et al. (2000) reported that the frequency of sufficient vigorous and moderate physical activity was lower and inactivity was higher for Black and Hispanic adolescents compared with White adolescents (Gordon-Larsen, McMurray, & Popkin, 1999).

Estimates of sufficient vigorous and sufficient moderate physical activity by ethnicity in the San Joaquin Valley and California are shown in Tables 10 and 11. The results indicated that at least one third of San Joaquin Valley adolescents ages 12-17, irrespective of ethnic background, did not engage in sufficient vigorous physical activity. The proportion of adolescents ages 12-17 who did not engage in sufficient moderate physical activity was even higher. According to 2001 CHIS estimates (UCLA Center for Health Policy Research), three out of five adolescents from every ethnic group did not engage in sufficient moderate physical activity. The results suggested that the proportion of adolescents in the San Joaquin Valley who do not engage in sufficient forms of physical activity is similar, regardless of ethnic group.

**Table 10**  
**Adolescents Ages 12-17 Not Engaging in Sufficient Vigorous Physical Activity by Ethnicity, 2001**

	San Joaquin Valley			California		
	Number	Percent	Total	Number	Percent	Total
<b>African American</b>	8,000	44.6%	17,000	75,000	37.8%	198,000
<b>American Indian</b>	1,000*	44.2%*	2,000	7,000	33.4%	20,000
<b>Asian</b>	8,000	40.8%	19,000	104,000	41.9%	249,000
<b>Latino</b>	61,000	40.7%	151,000	439,000	41.6%	1,055,000
<b>White</b>	53,000	35.5%	149,000	411,000	31.4%	1,308,000
<b>Other</b>	3,000*	28.6%*	10,000	38,000	32.1%	119,000
<b>Total</b>	133,000	38.3%	348,000	1,074,000	36.4%	2,949,000

\*Unstable data

*Note:* Totals are estimates which may vary due to rounding.

*Source: 2001 CHIS (UCLA Center for Health Policy Research, 2004)*

**Table 11**  
**Adolescents Ages 12-17 Not Engaging in Sufficient Moderate Physical Activity by Ethnicity, 2001**

	San Joaquin Valley			California		
	Number	Percent	Total	Number	Percent	Total
<b>African American</b>	12,000	68.6%	17,000	127,000	64.4%	197,000
<b>American Indian</b>	1,000	68.5%	2,000	13,000	66.3%	20,000
<b>Asian</b>	15,000	78.3%	19,000	174,000	69.9%	249,000
<b>Latino</b>	94,000	62.1%	151,000	720,000	68.6%	1,049,000
<b>White</b>	100,000	67.0%	149,000	878,000	67.1%	1,308,000
<b>Other</b>	6,000	63.6%	10,000	82,000	68.6%	119,000
<b>Total</b>	228,000	65.5%	348,000	1,993,000	67.8%	2,941,000

*Note:* Totals are estimates which may vary due to rounding.

*Source: 2001 CHIS (UCLA Center for Health Policy Research, 2004)*

In addition to physical inactivity patterns, certain sedentary behaviors can contribute to overweight and obesity. Television viewing is considered a sedentary activity and has been associated with overweight, decreased physical activity, and unhealthy dietary behavior among children and adolescents. According to the 2001 YRBS, 38.3% of students nationwide reported watching more than two hours of television per weekday (CDC, 2001). The 2001 CHIS data show that the amount of television viewing is similar in California and in the San Joaquin Valley.

In the Valley, at least 34.6% of children and adolescents ages 3-17 reported watching more than two hours of television per weekday (UCLA Center for Health Policy Research, 2004).

The 2001 YRBS also reported ethnic differences related to television viewing. Television viewing on an average weekday exceeded two hours among 69% of Black adolescents, 48% of Hispanic adolescents, and 31% of White adolescents (CDC, 2001). Lower estimates were found for California as a whole, where 42% of African American, 35% of Latino and 26.7% of White adolescents reported watching more than two hours of television per weekday (UCLA Center for Health Policy Research, 2004). The 2001 CHIS data show that in the San Joaquin Valley, 4 out of 10 African American and Latino adolescents and 3 out of 10 White adolescents reported watching more than two hours of television per weekday (see Table 12).

**Table 12**  
**Children and Adolescents Ages 3-17 Watching Television on Weekdays More Than Two Hours Per Day by Ethnicity, 2001**

	San Joaquin Valley			California		
	Number	Percent	Total	Number	Percent	Total
<b>African American</b>	143,000	40.7%	351,000	906,000	34.8%	2,609,000
<b>American Indian</b>	3,000	40.8%	7,000	15,000	42.3%	37,000
<b>Asian</b>	14,000	32.9%	43,000	220,000	34.3%	643,000
<b>Latino</b>	18,000	39.4%	45,000	205,000	42.2%	485,000
<b>White</b>	104,000	28.2%	369,000	853,000	26.7%	3,197,000
<b>Other</b>	7,000	34.7%	22,000	73,000	33.3%	221,000
<b>Total</b>	289,000	34.6%	837,000	2,272,000	31.5%	7,192,000

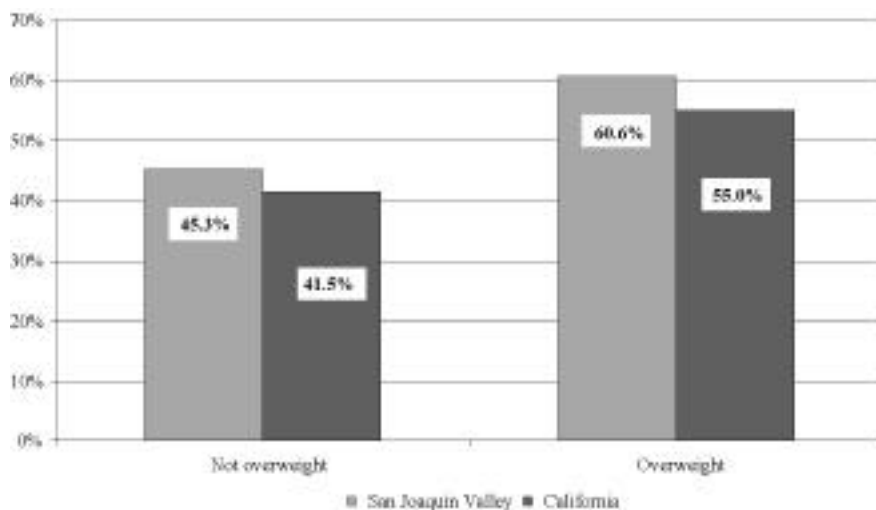
*Note:* Totals are estimates which may vary due to rounding.

*Source: 2001 CHIS (UCLA Center for Health Policy Research, 2004)*

Research suggests that the amount of time spent in sedentary activities, such as television viewing, is related to BMI. Berkey et al. (2000) reported that as the amount of television viewing time increased, BMI also increased. When a relationship between the amount of television watching per weekday and BMI was examined using 2001 CHIS data, the results indicated that 60.6% of children

and adolescents in the San Joaquin Valley who were overweight reported watching more than two hours of television per weekday. This was an estimated five percentage points higher than the state percentage (55.0%) of children and adolescents who were overweight and reported watching more than two hours of television per weekday (UCLA Center for Health Policy Research, 2004).

**Figure 4**  
**Overweight and Non-Overweight Children and Adolescents Ages 3-17 Watching Television on Weekdays More Than Two Hours Per Day, 2001**



*Source: 2001 CHIS (UCLA Center for Health Policy Research, 2004)*

Watching television more than two hours per weekday has also been associated with eating fewer fruits and vegetables (Lowry, Wechsler, Galuska, Fulton, & Kann, 2002). In the San Joaquin Valley, 42% of children and adolescents who watched television two or less hours per

weekday ate the recommended five daily servings of fruits and vegetables. In contrast, only 37% of children and adolescents who watched television more than two hours per weekday ate five daily servings of fruits and vegetables (UCLA, Center for Health Policy Research, 2004).



### **The Role of Physical Education**

According to the 1999 CalCHEEPS, children ages 9-11 in California were falling short of both the national physical activity recommendations specified in the Dietary Guidelines for Americans and the state physical education mandate for elementary schools. The recommendations are for 60 minutes or more of daily physical activity and 200 minutes or more of physical education (PE) every 10 school days. The 1999 CalCHEEPS reported that during a typical school week, only 18% of children reported participating in PE five times per week, 20% reported receiving PE three or four times per week, and over half of the children reported receiving PE one or two times per week. In addition, 17% of children reported not receiving any PE classes at school. On average, the amount of physical education taught in the schools was 2.3 classes per week, each consisting of 33 minutes each. This is almost one hour short of the mandated 200 minutes of exercise every 10 days (Public Health Institute, 2001).

The 1999 CalCHEEPS also reported racial/ethnic and household income disparities in the prevalence of physical education classes. Over one third of African American children and 40% of all children from households receiving food stamps reported participating in PE classes less than once per week. Statewide, 21% of children participated in PE classes less than once a week. These data also indicated that children from households receiving food stamps participated in PE classes for fewer minutes than

did children from households that were more affluent (24 minutes vs. 33 minutes average class time). Furthermore, children from low- and middle-income households were less likely than were those from high-income households to attend a school requiring physical education (Public Health Institute, 2001).

### **Summary**

Data about the prevalence of overweight among adolescents in the San Joaquin Valley indicated that at least one out of eight or 40,000 adolescents ages 12-17 were estimated to be overweight. Estimates of overweight based on gender demonstrated that more male adolescents than female adolescents were overweight. In the Valley, the percentages of overweight for African American and Latino adolescents were higher than were those for White adolescents. The largest proportion of overweight was found among adolescents from households with incomes between 200-299% of the federal poverty level. In addition, an estimated two out of three adolescents ages 12-17 did not engage in sufficient moderate physical activity. Levels of sedentary behavior (i.e., viewing television) among children and adolescents in the San Joaquin Valley exceeded those of the state as a whole. These findings suggest that more study about factors that contribute to overweight is needed in order to develop appropriate interventions for children and adolescents with this condition.



# Implications

Recent data have indicated that overweight among children and adolescents has increased at an alarming rate at the national, state, and local level. Broad efforts in nutrition education, promotion of physical activity, and overweight prevention are needed in order to address this trend and ensure a healthier future for children and adolescents. Educating communities about the health consequences of childhood overweight-related disease is a key to the success of these efforts and can be achieved by applying specific principles and strategies.

First, the best way to reduce the prevalence of overweight and obesity and its related costs is to prevent it. Parents and primary care physicians represent the front line of prevention of overweight in children and adolescents. Physicians can detect weight trends before they become severe and should advise families accordingly. The CDC's BMI standards according to age and gender provide an objective measure that can be used to initiate the discussion of overweight with parents. Physicians should also be familiar with the caloric needs of children and make appropriate recommendations for diet (Greger & Edwin, 2001).

Second, given that many overweight children are still developing, the goal may be weight stabilization, rather than weight loss. Weight stabilization is important, because overweight children experience accelerated weight gain. If this acceleration could be stopped, the child would have

the opportunity to grow into his or her appropriate weight. Although this is a slow process, it is much healthier than a sudden weight loss. In the case of severe overweight, weight loss should be gradual and calories should be restricted at a moderate rate (Greger & Edwin, 2001; U.S. Department of Health and Human Services, 2001).

Third, long-term behavior and lifestyle modifications are necessary for long-term success. For example, family-centered interventions provide opportunities for children to achieve and maintain healthy body weight because all family members are involved in changing nutritional and physical activity habits. City planning efforts in developing neighborhoods that feature retail and recreational facilities in close proximity to housing can encourage physical activity. Incorporating walking paths and bike trails in developing areas will help to influence healthy behaviors in our communities. Any approach needs to incorporate sensitivity to cultural preferences in activity and diet in local communities.

Current 2001 CHIS estimates of the prevalence of this condition indicate that the rates of childhood overweight in the San Joaquin Valley are some of the highest in the state. Evidence of the health and economic consequences of overweight among children at the national level underscores the urgency of addressing these conditions in the Valley.

# Discussion

Overweight in children and adolescents is a national and state epidemic. The San Joaquin Valley region has one of the highest rates of overweight adolescents in the state. The findings of this report showed disparities in the rates of overweight Valley adolescents by gender, race and ethnicity, and household income. Although impoverished households were home to one in three adolescents who are overweight, the majority of overweight adolescents in the Valley came from households with incomes well above the federal poverty level. These findings have implications for designing interventions to address this serious problem.

Given that more overweight adolescents in the San Joaquin Valley are male, and from an African American or Latino

background, it is important to design gender-specific and culturally sensitive approaches for overweight teens across the spectrum of low- and middle-income levels. Although demographic factors provide some insight into the characteristics of overweight teens, lifestyle issues, such as physical inactivity and dietary habits, play an even more important role.

Teen overweight in the San Joaquin Valley has been well-documented. Likewise, Valley children and adolescents of all ages engage in unhealthy lifestyle habits. San Joaquin Valley overweight teens reported higher rates of physical inactivity than do overweight teens statewide, with overweight Valley children and adolescents reporting long hours of television viewing on weekdays. The majority of chil-

dren and adolescents, age 3-17, engaged in television watching for at least two hours a weekday and reported eating fewer than the recommended five fruits and vegetables per day. Sedentary and poor dietary habits have implications for interventions designed to promote a more active lifestyle. However, lifestyle habits related to overweight and obesity are not easily changed and these findings indicate the need to target all age groups. Approaches to increase physical activity must be incremental and fostered on many levels, including school, community, family and peer group activities.

Researchers have provided evidence that overweight is influenced by a constellation of genetic, social, environmental, psychological, and physiological factors. Both intrinsic and extrinsic factors are important to consider in any approach to childhood obesity. Intrinsic factors such as genetic predisposition, temperament, and memory combine with social and environmental factors to influence a child's physical, emotional, and intellectual development. The complexity of the interaction of intrinsic and extrinsic factors complicates the design of simple interventions to address overweight among children and adolescents and contribute to confusion in studying this issue. Not one discipline—medicine, physical education, nutrition, psychology, or health education—has a perfect solution.

Obesity-related costs also factor into decisions about how to address the epidemic of childhood overweight in both the state and the San Joaquin Valley. Children of all ages who are overweight face a number of health risks associated with this health condition, as well as yet-to-be-calculated costs for addressing obesity-related diseases as they reach adulthood.

The increasing problem of overweight in the San Joaquin Valley has the potential to overwhelm public health resources dedicated to obesity-related diseases, thereby placing more stress on an already overburdened health care delivery system and increasing competition for fiscal allocations in publicly and privately funded health care programs.

Effective approaches must be community-driven and participatory, inclusive of parents, families, and community leaders, as well as health professionals, educators, nutritional experts, and psychologists. One particular point is of critical importance to remember: many lifestyle patterns are developed during childhood. Early intervention is therefore essential, considering that children who are overweight are at a greater risk for becoming overweight adolescents and obese adults.



# Recommendations

Considering the complexity of the issue of overweight among children and adolescents and based on the findings in this report, several recommendations for intervention are offered:

## Health Care Interventions

- Because the health care system is designed to treat as opposed to prevent chronic disease, primary care physicians need be even more proactive in helping prevent childhood obesity. For example, pediatricians need to screen at-risk children and educate their parents regarding the physical, emotional, and social consequences of obesity. Intervention by primary care physicians can translate into the prevention of future obesity-related diseases.

## Child-Centered and Family-Centered Education

- Educating children about the relationship between overweight, physical activity, and healthy nutrition early in life is an essential step in the prevention of overweight.

- Discussing with parents the predisposition for obesity (factors related to genetics), growth patterns, safe weight-maintenance and weight-loss methods, sound nutritional habits, and the importance of physical activity in overweight and obesity prevention can educate them about overweight and teach them how to relay these facts to their children.

## Health Promotion

- Many lifestyle patterns are developed during childhood. Health promotion efforts in schools and communities must take into account the constellation of intrinsic and extrinsic factors that influence the health behaviors of children, adolescents, and families. Approaches that both target key health behaviors and address social and environmental factors are most likely to foster lifestyle change.
- Effective health promotion approaches must be community-driven and supported and be designed with the inclusion of parents, families, and community leaders, as well as health professionals, educators, nutritional experts, and psychologists.

## School and Community Interventions

- If school districts fulfill the state mandate for physical education classes, more children will engage in regular physical activity as part of the school curriculum. A shift in emphasis from sport-skill development to physical activity in physical education classes will enhance campus efforts to engage children in moderate and vigorous physical activity.
- Considering that a main source of food for children and adolescents are school meals, school districts can take a proactive stance in the obesity epidemic by rigorously implementing dietary standards prescribed by current law and by insuring that all foods provided on campuses follow dietary guidelines for total fat and saturated fat as a percentage of food energy.
- Civic leadership can encourage the development of communities that include recreational facilities such as bike paths and safe pedestrian walkways.





# Conclusion

National, state, and local data indicate that childhood overweight is on the rise. Children's and adolescents' nutritional and exercise habits must be modified in order to reverse or arrest this alarming trend in weight gain so early in life and to avoid health problems that emerge during childhood and are carried over into adulthood. Unless something is done to reverse this trend, the increasing rates of overweight among children and adolescents will continue to stress healthcare and economic resources.

In the San Joaquin Valley, high rates of poverty, an expanding child population, and expanding ethnic and cultural diversity present additional challenges to achieving community health goals and reductions in childhood overweight. Viable solutions to combat the growing childhood

overweight trend need to take the cultural diversity and linguistic needs of San Joaquin Valley population into consideration. Interventions need to be both culturally and linguistically appropriate and supportive of families and communities concerned about childhood overweight and obesity as well as the sedentary behaviors that aggravate these unhealthy conditions.

The rising rate of overweight threatens the future quality of life of San Joaquin Valley. It has been well documented that overweight children suffer physical, psychological, and social consequences from this condition. Furthermore, these children are at a substantial risk of carrying these problems into adulthood, thus compromising their future health and quality of life. We must act now.



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