75 Title V Anniversary Celebration

Childhood Obesity in the United States, 1976-2008:

Trends and Current Racial/Ethnic, Socioeconomic, and Geographic Disparities




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Figure 1: Trend in Obesity and Overweight Prevalence (%) among U.S. Male and Female Children Aged 6-17 Years, 1976-2008

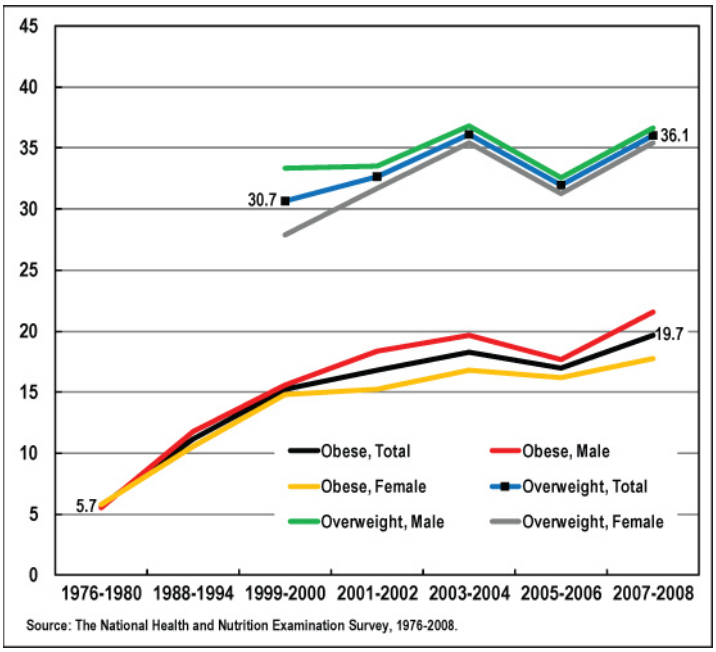
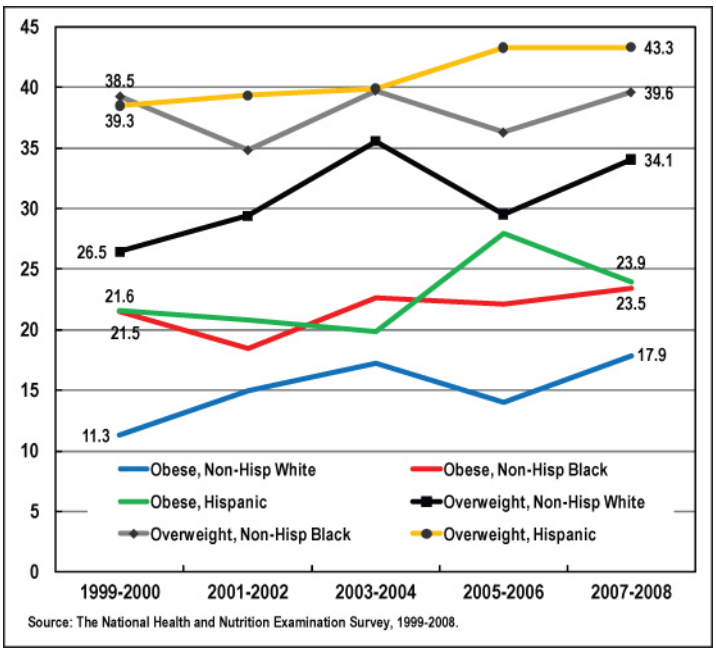


Figure 2: Trend in Obesity and Overweight Prevalence (%) among U.S. Children Aged 6-17 Years, by Race/Ethnicity, 1999-2008



The prevalence of childhood obesity has increased dramatically in the United States, with the rate having increased more than three-fold during the past three decades (1-4). Increases in obesity prevalence have been substantial among all gender, race, and socioeconomic groups (1, 3, 4). Because of a relatively high prevalence, a rapidly increasing trend, and the existence of large racial/ethnic and socioeconomic disparities, childhood obesity is recognized as a major public health problem in the United States (1-5).

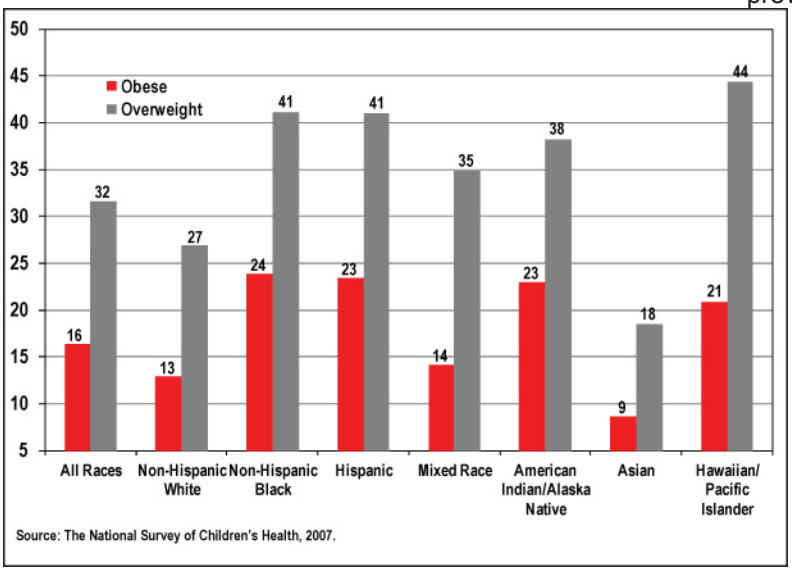
Monitoring disparities in childhood obesity by socioeconomic and demographic factors is important for several reasons (3). First, obesity has been identified as one of the ten leading health indicators for the nation, and reducing or eliminating racial and socioeconomic inequalities in health is one of the major goals of the national health initiative, Healthy People 2010 (6). Second, an analysis of both temporal and contemporary racial/ethnic and socioeconomic patterns in childhood obesity is important because it could help identify key population subgroups who may not only be at high risk but who may also have experienced significant increases in their obesity rates and who therefore can be targeted for obesity prevention programs (3-5). Third, documenting disparities between the least and most advantaged social groups or geographic areas can tell us the extent to which reductions in obesity prevalence can be achieved (3-5).

In this report, we examine time trends and current patterns in obesity and overweight prevalence among U.S. children and adolescents according to gender, race/ethnicity, household socioeconomic status (SES), and state of residence. The data on childhood obesity are obtained from two large, nationally representative federal health surveys and data systems: the 1976-2008 National Health and Nutrition Examination Surveys (NHANES) and the 2003 and 2007 National Survey of Children's Health (NSCH) [1, 3-5, 7, 8]. Both the NHANES and the NSCH are conducted by the Centers for Disease Control and Prevention's (CDC) National Center for Health Statistics (1, 3). However, the Health Resources and Services Administration's Maternal and Child Health Bureau provides the funding and direction for the NSCH. Details of the two survey data systems are provided elsewhere (3-5, 8). While the NHANES provides the long-term trend obesity data by gender and race, data on detailed racial/ethnic, socioeconomic, and geographic disparities are drawn from the NSCH (1, 3).

Long-Term Trends in Obesity and Overweight Prevalence

Overweight and obesity in children are defined as body mass index (BMI) at or above the gender- and age-specific 85th and 95th percentile BMI cutoff points from the 2000 CDC growth charts (1, 3-5). BMI in the NSCH was calculated from parent-reported height and weight data for children aged 10-17 years (3-5). BMI in the NHANES was based on measured height and weight data for children aged 6-17 years (1, 3, 7). Note that the overweight category (BMI ≥85th percentile) includes obese children (BMI ≥95th percentile).

Figure 3: Obesity and Overweight Prevalence (%), U.S. Children Aged 10-17 Years, 2007



According to the NHANES data, the prevalence of obesity among children aged 6-17 increased sharply between 1976 and 2008 for the total child population as well as for male and female children (Figure 1). The obesity prevalence for male children quadrupled from 5.5% in 1976-1980 to 21.6% in 2007-2008. For female children, the obesity prevalence tripled from 5.8% in 1976-1980 to 17.7% in 2007-2008. The average annual rate of increase in obesity prevalence was 4.5% for male children and 3.8% for female children.

Between 1999 and 2008, the obesity and overweight prevalence among children aged 6-17 years, based on the measured BMI data from the NHANES, increased by 29% and 18%, respectively. In 2007-2008, 19.7% of U.S. children aged 6-17 were obese and 36.1% were overweight (Figure 1). Between 1999 and 2008, the obesity prevalence increased by 58% for non-Hispanic white children aged 6-17, 9% for black children, and by 11% for Hispanic children. The overweight prevalence for non-Hispanic white children aged 6-17 rose by 29% from 26.5% in 1999-2000 to 34.1% in 2007-2008 (Figure 2).

Racial/Ethnic Disparities in Childhood Obesity and Overweight Prevalence

Since the NHANES lacks obesity data for children and adolescents other than those for non-Hispanic white, black, and Hispanic children, obesity rates for children from detailed racial/ethnic groups were obtained from the NSCH. The 2007 NSCH data indicate substantial racial/ethnic disparities in obesity and overweight prevalence for children aged 10-17 years (Figure 3). In 2007, 16.4% of U.S. children aged 10-17 were obese and 31.6% were overweight. The obesity prevalence was highest among non-Hispanic Black children (23.9%), followed by Hispanic children (23.4%), American Indian/Alaska Native children (23.0%), Hawaiian/Pacific Islander children (20.9%), mixed-race children (14.2%), and Asian children (8.7%). The overweight prevalence ranged from a low of 18.4% for Asian children aged 10-17 to a high of 44.3% for Hawaiian/Pacific Islander children; 41% of Black and Hispanic children were overweight (Figure 3).

Trends in Socioeconomic Disparities in Obesity and Overweight Prevalence

The obesity and overweight prevalence increased significantly in relation to decreased levels of household education and income in both 2003 and 2007 (Figures 4 and 5). Specifically, the obesity prevalence for children with parents having fewer than 12 years of education was 30.4% in 2007, 3.1 times higher than the obesity prevalence (9.7%) for children whose parents had a college degree (Figure 4). The obesity prevalence for children living below the poverty line was 27.4% in 2007, 2.7 times higher than the obesity prevalence (10.0%) for children with family income exceeding 400% of the poverty threshold (Figure 5). Nearly half of all children in low-education and low-income groups in 2007 were overweight, compared with less than 23% of children in the high-education or high-income group.

Socioeconomic differentials in childhood obesity and overweight prevalence were greater in 2007 than in 2003 as the relative risks of obesity and overweight among children in low SES groups compared to children in high SES groups were smaller in 2003 than in 2007 (4). Moreover, while the obesity and overweight prevalence among children in the lowest SES groups increased significantly between 2003 and 2007, the prevalence actually declined among children in the highest SES groups (Figures 4 and 5).

Geographic Disparities in Obesity and Overweight Prevalence

According to the NSCH data, the obesity prevalence in 2007 varied from a low of 9.6% for children in Oregon to a high of 21.9% for children in Mississippi (5). Overweight prevalence varied from a low of 23.1% for children in Utah to a high of 44.5% for children in Mississippi. Among male children, the obesity prevalence in 2007 was lowest in Oregon (11.0%) and highest in Arkansas (27.2%). Female children in Wyoming and Texas had the lowest and highest obesity prevalence, 5.5% and 20.2%, respectively (5).

A relatively higher prevalence of obesity and overweight was observed in the Southeastern region of the United States, and a larger number of states showed a shift towards higher prevalence in 2007 compared to 2003 (Figures 6-9). The obesity prevalence increased between 2003 and 2007 by 46% for children in Arizona and by 32% for children in Illinois. Between 2003 and 2007, the obesity prevalence declined by 32% for children in Oregon. The overweight prevalence increased by 21% and 29% for children in Mississippi and Nevada, respectively (5).

Figure 4: Trends in Obesity and Overweight Prevalence (%) among Children Aged 10-17 Years, by Household or Parental Education, United States, 2003-2007

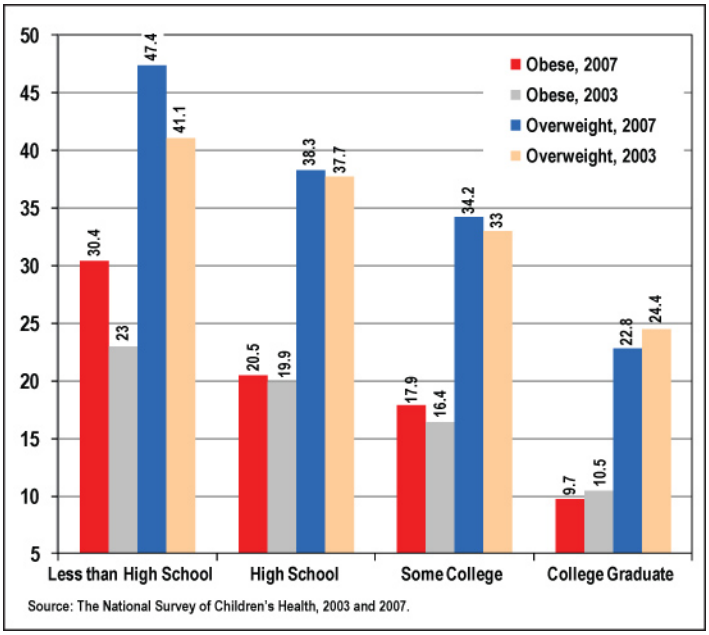
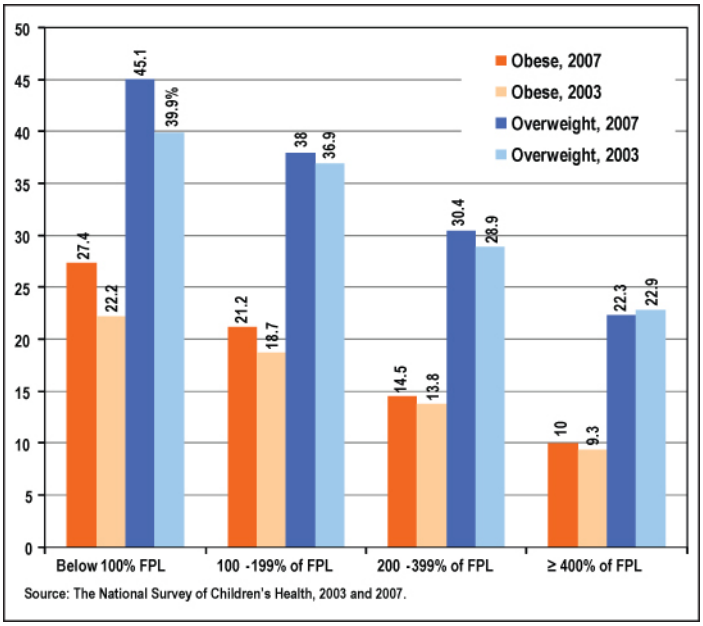


Figure 5: Trends in Obesity & Overweight Prevalence (%) among Children Aged 10-17 Years, by Household Income/ Poverty Status (Federal Poverty Level (FPL)), United States, 2003-2007



Summary and Discussion

The long-term trend data from the NHANES show a four-fold increase in obesity prevalence among male children and a three-fold increase in obesity prevalence among female children between 1976 and 2008 (3). The latest 2007-2008 NHANES data show a current obesity prevalence of 20% and an overweight prevalence of 36% for children aged 6-17 years. The number of obese children aged 6-17 years increased from 6.9 million in 1999-2000 to 9.3 million in 2007-2008, while the number of obese or overweight children aged 6-17 grew from 14.1 million in 1999-2000 to 17.1 million in 2007-2008 (3). Between 1999 and 2008, the obesity prevalence increased significantly for all children and for non-Hispanic white, black, and Hispanic children aged 6-17.

According to the NSCH data, 16.4% of U.S. children aged 10-17 years (i.e., 5.2 million children) were obese in 2007, which suggests an increase of 10% in prevalence or 570,000 additional obese children aged 10-17 since 2003 (3, 4). An overweight prevalence of 31.6% in 2007 meant that there were over 10 million U.S. children aged 10-17 years who were obese or overweight – an additional 512,000 overweight children aged 10-17 since 2003 (3, 4).

Large racial/ethnic disparities in obesity and overweight prevalence exist among U.S. children. Although black and Hispanic children have two times higher obesity rates than non-Hispanic white children, analysis of detailed ethnic disparities indicates that black, Hispanic, Hawaiian/Pacific Islander, and American Indian/Alaska Native children have nearly three times higher risks of obesity and overweight than Asian children (3, 4). Almost one in four Black, Hispanic, or American Indian/Alaska Native children is obese, compared with fewer than one in ten of Asian American children. The overweight prevalence for Black, Hispanic, and Hawaiian/Pacific Islander children currently exceeds 40%. A recent study showed an increase in the magnitude of racial/ethnic disparities in childhood obesity and overweight prevalence between 2003 and 2007 (4).

Household socioeconomic status is a powerful determinant of childhood obesity in the United States. An inverse, significant association between household income, education, and employment and obesity and overweight prevalence exists for children in all major racial/ethnic groups (3, 4, 9). Children from low-education and low-income households have three times higher obesity prevalence than children from high SES households. Nearly half of all children in the low SES group are overweight, compared with one in four children from the high SES group. However, the socioeconomic gradients in obesity and overweight prevalence are not just limited to differences between the highest and lowest SES groups. Instead, the gradient in obesity and overweight risks extends progressively downward from the poor through the lower middle class, upper middle class, and to the most affluent group. The excess obesity burden is therefore shared greatly by children and families in the middle SES groups who make up more than half of the child population or households (3).

Figure 6: Obesity Prevalence, Children Aged 10-17 Years, 2007 (The National Survey of Children's Health)

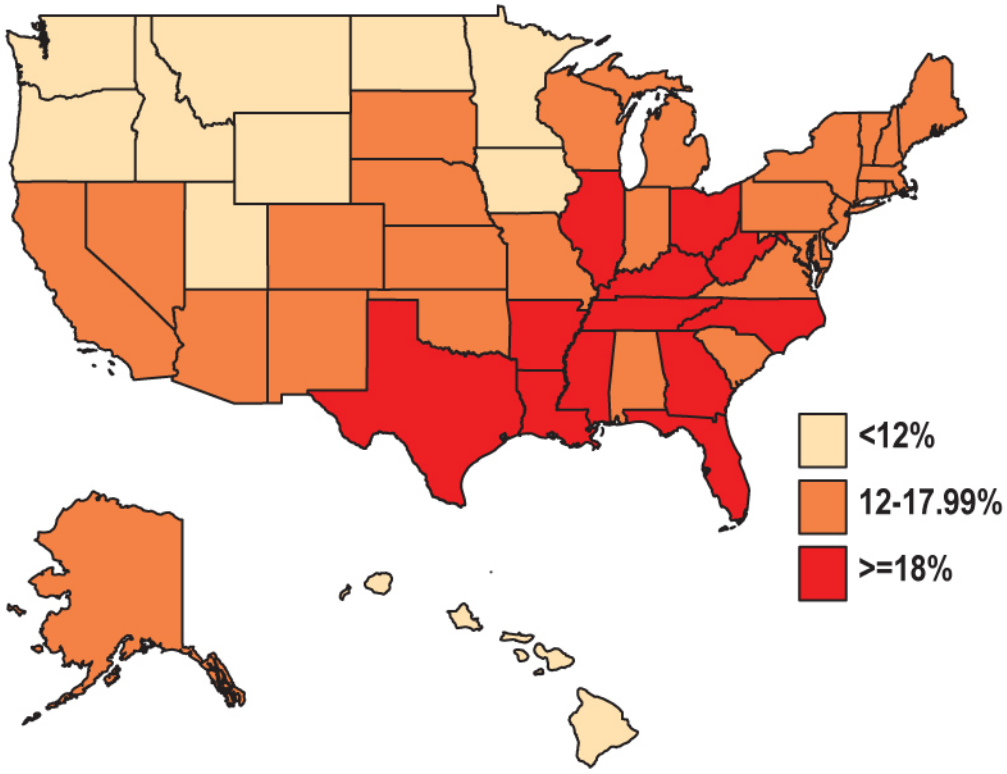


Figure 7: Obesity Prevalence, Children Aged 10-17 Years, 2003 (The National Survey of Children's Health)

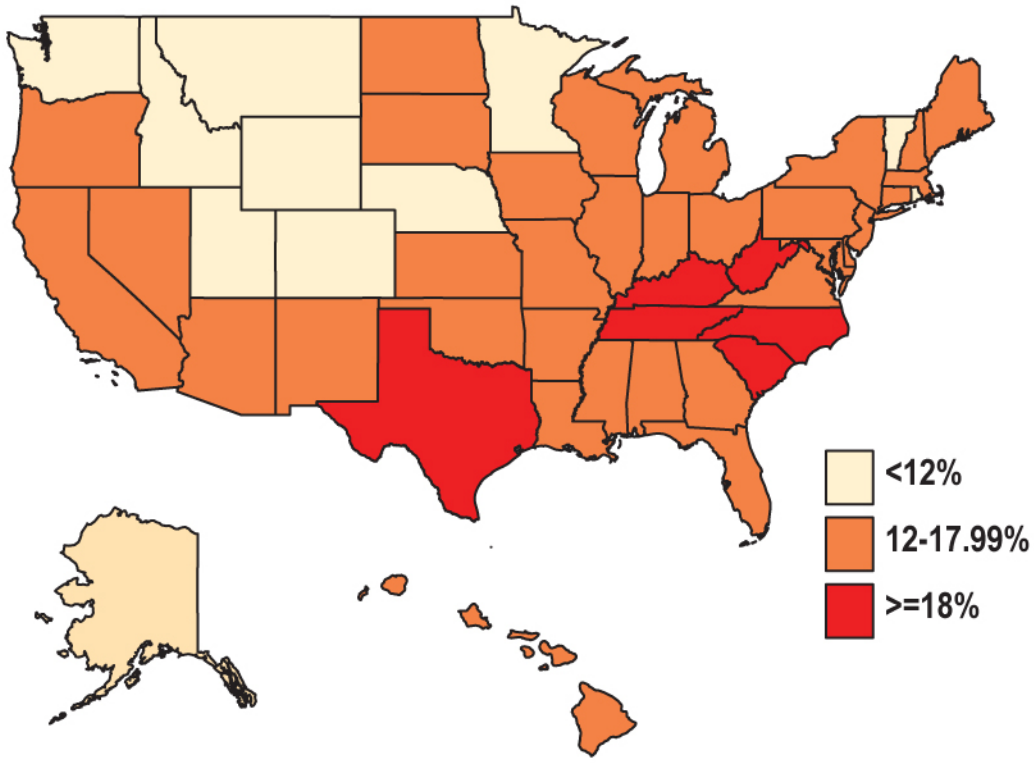


Figure 8: Overweight Prevalence, Children Aged 10-17 Years, 2007 (The National Survey of Children's Health)

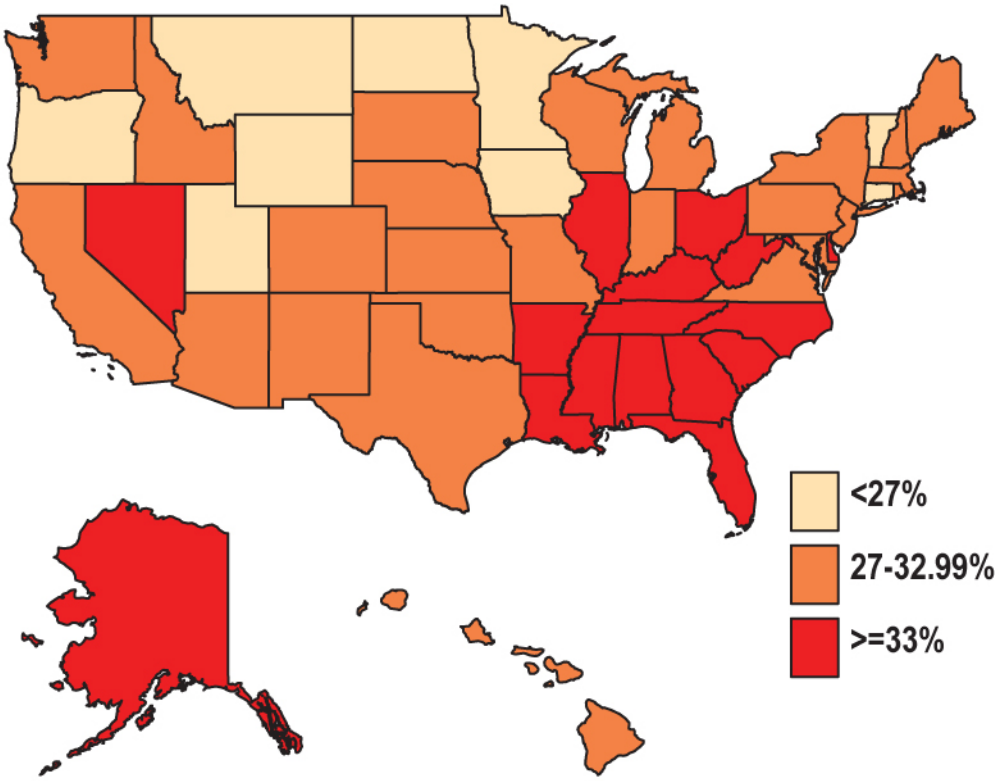
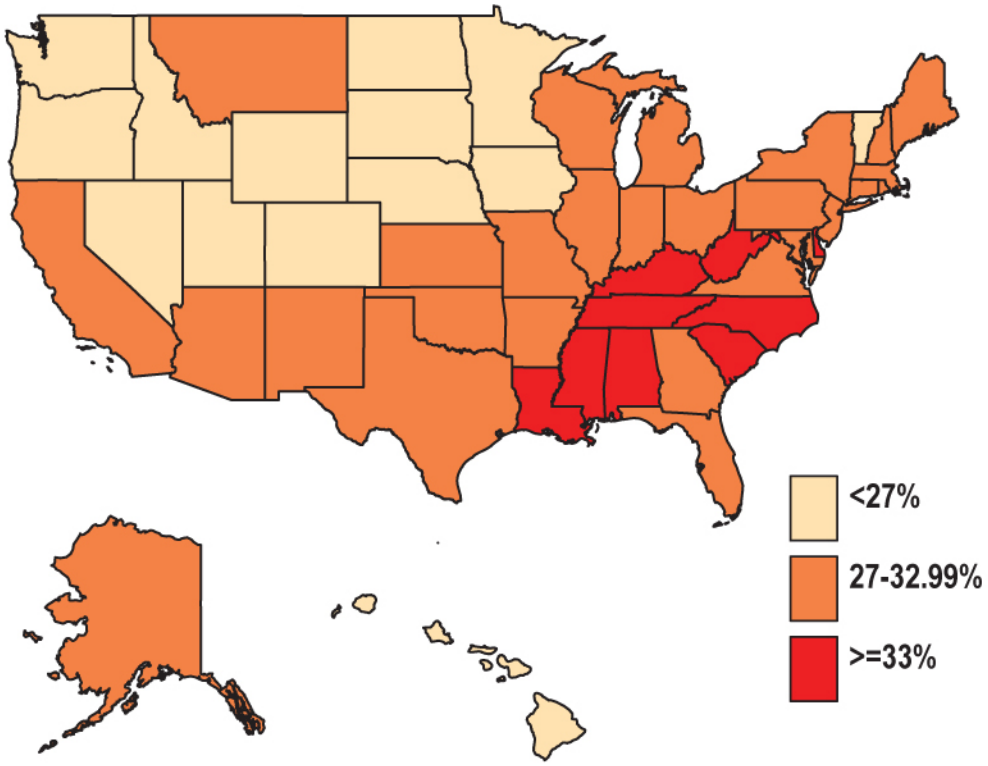


Figure 9: Overweight Prevalence, Children Aged 10-17 Years, 2003 (The National Survey of Children's Health)



Substantial geographic disparities in childhood obesity exist, with the Southeastern states (such as Mississippi and Georgia) having the highest obesity prevalence and the Western states (such as Oregon and Wyoming) with the lowest obesity prevalence. In 2007, the childhood obesity rates for states such as Mississippi, Georgia, Kentucky, Illinois, Louisiana, Tennessee, Arkansas, Texas, and the District of Columbia exceeded 20%, whereas the obesity rates for Oregon and Wyoming were approximately 10% (5).

The geographic disparities in childhood obesity prevalence increased between 2003 and 2007. Oregon was the only state for which obesity prevalence declined significantly between 2003 and 2007. The obesity prevalence increased significantly for children in Arizona and Illinois (5). However, there were a number of states, such as Arkansas, Colorado, Georgia, Florida, Ohio, and Utah, that experienced large but statistically insignificant increases in their obesity and/or overweight prevalence. Overall, when geographic patterns for 2003 and 2007 are compared, an apparent shift toward higher obesity and overweight prevalence in 2007 can be seen for a number of states (5).

Socioeconomic, behavioral, neighborhood social conditions, and built environmental characteristics have been shown to account for a substantial portion of the racial/ethnic, SES, and geographic disparities in childhood obesity and overweight prevalence documented here (3-5, 10). Sedentary behaviors such as physical inactivity, excess television viewing time, and recreational computer use have been related to increased obesity risks in U.S. children (4, 9). Neighborhood socioeconomic conditions and the built environments, including access to sidewalks or walking paths, bike trails, clean and safe streets, adequate housing, playgrounds and outdoor parks, adequate public transportation, and access to healthy foods, have also been shown to influence obesity risks in children (5, 10).

The recent increase in the prevalence of childhood obesity at the national level and in several of the states may partly be attributed to increases in the proportion of the socially disadvantaged populations as the percentage of households with Hispanic children and children from low-income, high-unemployment, and non-English speaking households grew between 2003 and 2007 (4, 5). Additionally, a more rapid increase in the obesity prevalence among Hispanic children and among children from lower socioeconomic backgrounds has been cited as a major factor in the rise of social inequalities in U.S. childhood obesity (4). However, the extent to which changes in the social, built, or obesogenic environments might have contributed to recent trends in childhood obesity is not clear (4, 5). The 2003 and 2007 NSCH data did not show any marked changes in levels of physical inactivity or other sedentary activities at the national level (4). Dietary factors such as mean calorie intake and fat intake have increased consistently over time among both youth and adults in the U.S. (1, 3, 11), and recent trends in these factors may have contributed to the increase in childhood obesity at the national level as well as in specific states.

The United States has one of the highest rates of childhood obesity in the industrialized world (3, 9). Existence of large racial/ethnic, socioeconomic, and geographic inequalities in obesity, as those shown here, has been suggested as one of the reasons for its unfavorable international standing (3, 9). Monitoring such social disparities in U.S. childhood obesity rates is therefore vital in tracking progress toward achieving the broad national health objectives of reducing and ultimately eliminating health inequalities and in evaluating the impact of specific policy interventions in reducing childhood obesity (3-5). As of 2007, children and adolescents in all racial/ethnic and socioeconomic groups as well as in all states fell considerably short of the national goal for childhood obesity prevalence – which is set at 5% for the year 2010 (3-6). In fact, the recent patterns in the obesity prevalence seem to indicate that the rates for children in most social groups are moving farther away from the national target.

Marked racial/ethnic, socioeconomic, and geographic disparities shown here indicate the potential for considerable reduction in U.S. childhood obesity (3-5). However, continuing disparities in childhood obesity prevalence are likely to exacerbate health inequalities among both children and adults (3, 5). Obesity prevention programs should not only include behavioral interventions aimed at reducing children's physical inactivity levels and limiting their television viewing and recreational screen time, but should also include social policy measures aimed at improving the broader social and physical environments that create obesogenic conditions that put children at risk for poor diet, physical inactivity, and other sedentary activities (3-5, 10).

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