

ORIGINAL REVIEW

CHILDHOOD OBESITY, ITS PREVALENCE AND HEALTH IMPACT ON CHILDREN AND ADOLESCENTS IN ORANGE COUNTY, CALIFORNIA, USA

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ABSTRACT

Childhood obesity is a global issue. It is one of the most serious public health issues of the 21st century, which affects the under-developed, developing, and progressive nations. The prevalence of obesity has increased to a concerning rate. Overweight and obese children are predicted to remain obese into adulthood and will develop non-communicable diseases, such as diabetes and cardiovascular diseases, at a younger age than those who are not obese. Therefore, prevention of childhood obesity is imperative.

In the United States, childhood obesity is a serious problem that put children and adolescents at risk of poor health. For children and adolescents aged 2 to 19, the prevalence of obesity is 18.5%, and it affects about 13.7 million of them. The prevalence of obesity is 13.9% among children aged 2 to 5, 18.4% among those aged 6 to 11, and 20.6% among those aged 12 to 19. Notably, childhood obesity is more common among certain races and ethnicities. The prevalence of obesity among Hispanics (25.8%) and non-Hispanic Blacks (22.0%) is higher than non-Hispanic Whites (14.1%). The prevalence of obesity is lower in non - Hispanic Asians (11.0%) than non-Hispanic Blacks and Hispanics.

KEYWORDS: biopsychosocial theory, body mass index, childhood obesity, disease, prevalence, orange county, california

Tendency of Overweight and Obesity in Orange County, CA

Overweight and obesity is measured using body mass index (BMI). Specifically, BMI is a measurement of an individual's body fat based on his or her weight in relation to his or her height in order to determine the person's weight status. This applies to most men and women aged 20 and over. For children aged 2 and older, BMI percentile is the best assessment of body fat [Medical News Today, 2016]. BMI is the most widely accepted method used to screen for overweight and obesity in children and adolescents. BMI is age-and-gender-specific for children and teens. It is a reliable indicator of the amount of fat in the body. According to the Center for Disease Control, overweight is de-

defined as a child or teen, whose BMI is at or above the 85th percentile and lower than the 95th percentile [CDC, 2012a]. The percentile indicates the relative position of the child's BMI number among children of the same gender and age.

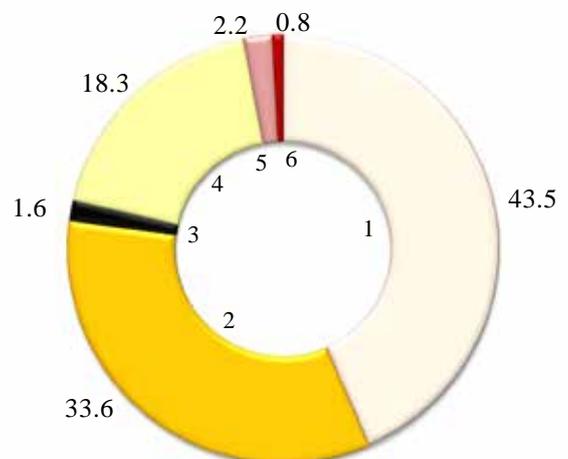


FIGURE 1. 1.Race & Ethnicity In Orange County, CA (2015)
Notes: (1)-White (non-Hispanic), (2) - Hispanic, (3) - Black, (4) - Asian, (5) - Mixed (non - Hispanic), (6) - Other

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TABLE 1.

Socio-Demographic Characteristics of Orange County Residents, CA (2015)

Socio-Demographic Characteristic	Percent	Socio-Demographic Characteristic	Percent
Families w/Children under 18 Living in Poverty	9	Households by Head's High-School Degree	25.5
Housholds Living below the Poverty Line	12	Educational Level Bachelor Degree or Higher	3.2
People with Health Insurance	80	Elementary Students	37.4

Orange County (OC) is the third largest county in the populous State of California. OC's population is 3,051,771. As represented in Figure 1, the ethnic and racial makeup of Orange County is as follows: 1.33M White (43.5% - non-Hispanic), 1.03M Hispanic (33.6% - excluding Black and Asian Hispanic), 560k Asian (18.3%), 49.8k Black (1.6%), 68.6k Mixed (2.2% - non-Hispanic mixed race people), 21.3k Other (0.8% - American Indians and other group not otherwise categorized [Statistical Atlas, 2015].

Table 1 indicates that 366, 212 (12%) OC residents live below the poverty line and of this figure, 25.5% of the heads of the households did not graduate from high school and 3.2% have a bachelor degree or higher. About 9% of the 712,753 families with children under 18 live in poverty. Of 868,966 students, 37.4% are in elementary school. Nearly a fifth of OC population does not have health insurance. As for annual household income, Figure 2 indicates that a third earns less than \$50k, 56.4% earn \$50k but less than \$200k, and 10.3% earn \$200k or more [Cuniff M. M., 2014].

Table 2 breaks down the demographics by race/

ethnicity of Orange County's children population. The poverty status is determined by families with children below the poverty level and it is broken down into three groups: (1) children who come from married households, (2) children who come from single male households, and (3) children who come from single female households. For each race/ethnicity, the percentages are determined by dividing by the number of families with children living below the poverty level the number of those from each household type. For certain races/ethnicities, there was insufficient data to calculate a percentage. Public assistance refers to families receiving Social Security Income, a federal government program, as well as families that participate in the State food stamps program (see Figure 3 for variation by race/ethnicity).

TABLE 2.

Selected Demographic Characteristics of Children of Orange County, CA (U.S. Census Bureau, 2010)

Race/Ethnicity	Number of Children	Household Type		
		Married	Only Male	Only Female
White	401,012	21.2%	5.1%	30.1%
African American	11,043	33%	0%	61.1%
American-Indian	2,070	-	-	-
Native Hawaiian & Pacific Islander	2,761	-	-	-
Hispanic	348,784	43%	14.7%	38.2%
Asian	109,053	38%	4.7%	20.5%
Other	120,787	37%	15%	43%

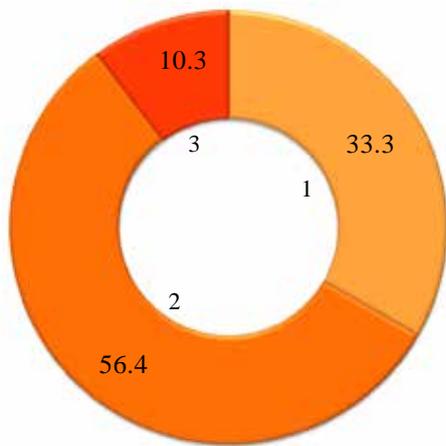


FIGURE 2. Annual Household Income in Orange County, CA (2015)

Notes: (1)-Less than \$ 50k, (2) - \$ 50k -Less than \$ 200k, (3) - \$ 200k or more

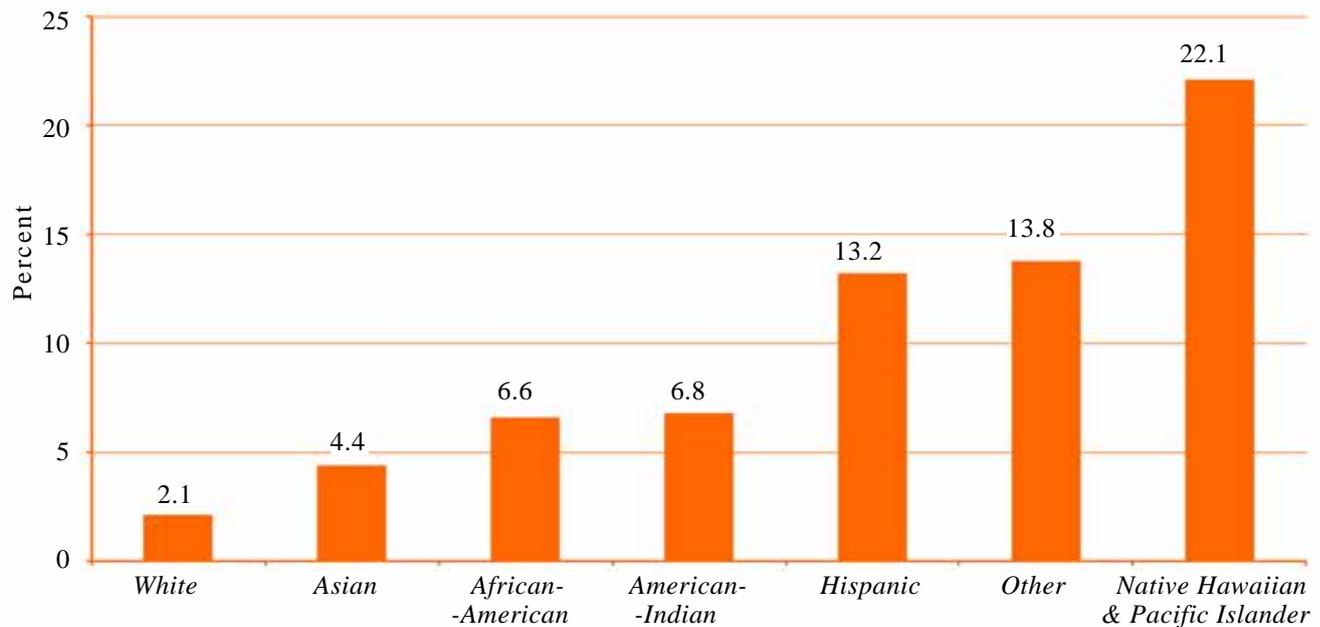


FIGURE 3. Percent of Families w/Children under Public Assistance, Orange County, CA (U.S. Census Bureau, 2010)

Impact of Childhood Obesity

In California, particularly Orange County, childhood obesity continues to be of an epidemic proportion. If the growing trend is not addressed, this generation of U.S. children will be the first to have a shorter average lifespan than their parents [Daniels S, 2006; Signorino M, Winter W, 2008].

Recent studies have established links between obesity and type II diabetes [Eckel RH, et al., 2011]. Furthermore, obesity and diabetes are major factors to the leading causes of death in the United States (US). Of the main causes of death, diabetes is one of them and obesity is the second leading contributor. In the last 30 years, the rate of those living with diabetes have been on the rise [Orange County Health Improvement Plan, 2017-2019].

The study made by the U.S. Department of Health and Human Services shows that 70% of obese children have at least one cardiovascular disease risk factor and 39% have two or more. Obese children also have increased risk of impaired glucose tolerance, insulin resistance, and type II diabetes. Breathing problems, such as sleep apnea and asthma are also observable in overweight or obese children compared to children with normal weight [HHS, 2012]. Children and adolescents who are obese suffer from bone and joint problems, musculoskeletal discomfort, fatty liver disease, gallstones, and gastro-esophageal reflux (heartburn) [CDC, 2012a; Daniels, S,

2006]. Additionally, they suffer from social and psychological problems, such as stigmatization, and poor self-esteem, which can continue into adulthood. Obese individuals are stigmatized in American society, and obese children are often the victims of negative stereotyping, discrimination, teasing, and bullying [Harper M G, 2006]. Overweight adolescents have a 70% chance of becoming overweight or obese adults. The risk increases to 80%, if one or more parent is overweight or obese. Overweight or obese adults are at risk for a number of health problems including heart disease, type II diabetes, high blood pressure, and some forms of cancer [CDC, 2012a; Daniels S, 2006]. A study by [Marder W D, Chang S, 2006] of children who have private health insurance, found that 9.9% of obese children have depression compared to 1.4% of non-obese children. Additionally, 10.7% of them have other diagnosed neuroses (mental disorders such as anxiety, obsessive thoughts, and or compulsive acts) compared to 2.0% of non-obese children.

In 2015, in Orange County, of the 33% of students measured with an unhealthy body composition, 16% were considered to be obese, while 17% were considered overweight (unchanged from the previous year). In particular, Santa Ana and Anaheim school districts had the highest number of overweight youth, while Laguna Beach and Irvine school districts had the lowest number of over-

weight youth. Furthermore, according to St. Jude Needs Assessment, about 28.8% of children ages 2 to 17, who are either overweight or obese, reside in the area it serves [*St. Jude Medical Center, St. Jude Heritage Healthcare, 2010*]. In 2009, among low income children, 14% of those ages 0 to 4 and 20.6% of those 5 to 19 were obese [*17th Annual Report on the Conditions of Children in Orange County, 2011*]. Over the past 30 years, the percentage of American youths who are obese has more than tripled, rising from 5% to near 18% [*CDC, 2012a*]. More figures depending on the race and age are given in Table 3.

TABLE 3.
Prevalence of Obesity Among Low Income Orange County Children by Race and age, 2010
(Condition of Children in Orange County Report 2011)

Race	Ages		
	0-4 (%)	5-11 (%)	12-19 (%)
African-American	10.9	N/A	N/A
Asian	9	14.4	8.7
Hispanic	14.8	23.2	20
White	11.1	12.9	17.5
All Races	14	22	19.2

The price of treating obesity and obesity-related conditions costs billions of dollars a year. According to the California Department for Public Health Advocacy, 38% of fifth, sixth, seventh, eighth, and ninth graders in California are overweight or obese, 75% of overweight teens are likely to be obese adults, and 80% of children diagnosed with type II diabetes are overweight. Due to diabetes, California ranks first in the nation in health spending. California's healthcare cost for all ages that is obesity related is \$21 billion a year.

BIOPSYCHOSOCIAL ASSOCIATION OF OBESITY AND OVERWEIGHT

Research has shown that biopsychosocial factor plays a role in obesity and overweight. For example, a study finds that Americans who reside in the most-poverty dense counties are more prone to obesity than those living in wealthy counties. Additionally, overweight and obesity result from a disproportionate and excessive caloric consumption and/or the lack of physical activity. Overall, an individual's body weight is the result of biopsy-

chosocial influence based on a combination of genetic, metabolic, behavioral, environmental, cultural, and socioeconomic variables. Of all these influences, behavioral and environmental factors play a larger role as contributors to overweight and obesity [*Borrell-Carrió F, et al. 2004*].

Strategies to Prevent and Revise Obesity and Overweight

All things considered, it seems strategic to apply a biopsychosocial approach in any intervention, prevention, and treatment program of overweight and obesity.

What is biopsychosocial approach? According to (Borrell-Carrió & et al, 2004), biopsychosocial model encompasses philosophy of clinical care and a practical clinical guide. It is a whole-person approach in understanding that multiple levels of organizations, from societal to molecular, impact suffering, disease, and illness. Additionally, it is an understanding of a person's subjective experience as a key contributor to accurate diagnosis, health outcomes, and human care.

The state of a child's health involves a process and commitment. In order to achieve a healthy birth outcomes, it begins with a healthy pregnancy. This should follow with health-focused practices, such as breastfeeding, immunizations, physical activity, and proper and nutritious diet, from infancy and childhood [*Orange County Health Improvement Plan, 2017-2019*].

Childhood obesity is a widespread health issue problem that plague communities and the nation. Thus, it is imperative to fight and curb obesity at the childhood stages. The fight against childhood obesity epidemic requires a collaborative effort of researchers, public policy makers, community-based organizations, schools, and parents. A decrease in obesity among children and adolescence will prevent the onset of adult health issues related to obesity. Consequently, it will lead to a healthier nation, a reduction of healthcare cost, a more productive workforce, and stronger economy.

According to the Center for Disease Control, the key in reducing the prevalence of childhood obesity is to increase good nutrition along with physical activity. Given the targeted children population, the intervention plans should be comprehensive. It should include parents, caregivers, edu-

cators, healthcare professionals, community members, and elected officials. The objectives are to have healthier homes, schools, afterschool environments, and communities [CATCH, 2012; CDC, 2012a].

Improving the health of the community requires a well-coordinated and functioning public healthcare system that supports efforts to provide high quality programs and services. The Orange County Community Health Needs Assessment helped to identify strengths, weaknesses, and opportunities for improvements in the public health system [CBSA, 2010]. As depicted in the illustration below, the public health system is a partnership between many entities, including residents, healthcare providers, community-based organizations, schools, businesses, and government agencies that contribute to promoting public's health.

Orange County's Healthier Together program is a community-wide initiative that aligns public and private resources, within the public health system, to improve health for all who live, work, and engage in recreation in Orange County. The initiative is administered by the Orange County Health Care Agency and Public Health Services [Orange County Health Improvement Plan, 2017-2019].

When initiating and developing a prevention and intervention program, it is important to consider the targeted population's age, ethnicity, and socioeconomic status. Additionally, it is best to apply specific educational strategies appropriate to the young individuals' mental development phase. The Center for Disease Control recommends that nutrition education for young children should be based on concrete and real experiences, while more abstract suggestions between nutrition and health can be used as children approach middle school. For middle and high school students, it is recommended that nutrition education focuses on helping students evaluate their eating habits and on setting objectives to increase their consumption of a variety of food. Thus, to produce successful outcomes, effective nutrition education programs must include age-appropriate elements [CDC, 2012a].

FOOD, DESSERT, NUTRITION AND OBESITY

One of the causes of the increasing obesity rates is the difficulty to obtain affordable and fresh food.

37.7% of families living below the poverty rate in Orange County have difficulty obtaining affordable fresh food. Studies have shown that there is an association between the availability food service providers and obesity. According to St. Jude Medical Center, people's BMI is likely to increase were they to live in poor neighborhoods, and when the average persons frequent grocery stores located in disadvantaged neighborhoods [St. Jude Medical Center, 2012]. Given that access to fresh produce has worsened over the past five years, children are unlikely to receive proper nutrition, hence increasing the correlation between nutrition and obesity rate among them.

Government Nutrition Assistant Programs

Within the US, there are federal and state funded programs to help those who qualify for assistance. For example, two programs, CalWORKS and the National School Lunch program offer financial and nutritional assistance to needy families and children.

The CalWORKS program, funded by the State of California, provides financial assistance to eligible needy families and children. As shown in Figure 4, in Orange County, 5.4% of all children receive financial assistance through CalWORKS, compared to 11.3% of all children in the nation (Condition of Children in Orange County Report, 2011). Over a 10-year period, there was a 7.4% increase in the number of children receiving financial aid in the nation. In Orange County alone, the number is 5% [17th Annual Report on the Conditions of Children in Orange County, 2011]. CalWORKS' goal is to improve the overall wellbeing of children through school health requirements, immunizations, and child support program [CDSS, 2010].

The National School Lunch Program, a federally funded program, is administered by the U.S. Department of Agriculture. It assists schools and other agencies in providing nutritious lunch to children. In order for children to qualify, their families or guardians subsist at 185% below the Federal Poverty Level. Basically, the yearly income, for a family of four, cannot exceed \$40,793.

In 2010, 45% of schools in Orange County participated in the Free Reduced Lunch Program. As indicated in Table 4, their participation ranged between 10% and 86% [17th Annual Report on

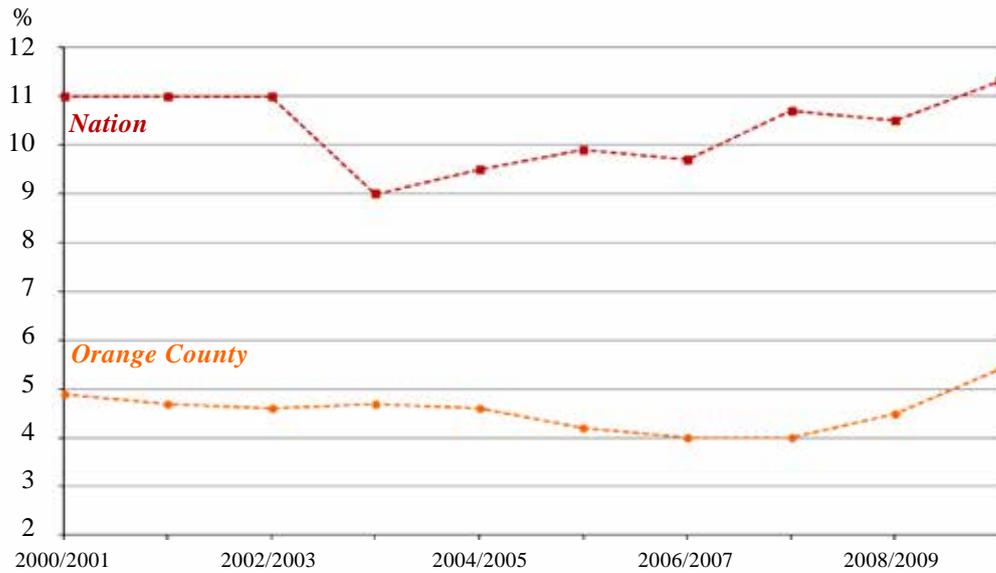


FIGURE 4. Percent of Children Receiving CalWORKs of the Total Population under 18 years of Age, 2000-2001 to 2009-2010 (Conditions of Children in Orange County Report, 2011)

the Conditions of Children in Orange County, 2011]. Between 2001 and 2011, Orange County saw an 18.4% increase in the number of students receiving free and reduced lunch (see Figure 5). The Free Reduced Lunch program gives children access to nutritious meals, and it exposes them to healthy eating habit.

Health Behaviors indicate that 12.7% of children in Orange County engage in physical activity [UCLA Center for Health Policy Research, 2012]. Only 17.6% have the required five or more servings of fruits and vegetables daily. Furthermore, a staggering 67.1% of children have had

one or more servings of soda or sugary drinks within the last 24 hours.

URGENCY IN ADDRESSING CHILDHOOD OBESITY

According to the Orange County Community Health Needs Assessment, 30% of OC’s children are either overweight or estimated to be at risk of becoming overweight. Within this group, 57.1% are Hispanic/Latino. Additionally, 10.1% of all teens in Orange County between 12 and 17 years old are estimated to be overweight [CBSA, 2010].

Excess weight affects not only the overweight individuals, it impacts others as well. Overweight and obesity increase the individual’s risk of developing conditions such as diabetes, heart disease, osteoarthritis, and some cancers [CDC, 2012a]. Obesity may reduce an individual’s longevity and quality of life [Daniels S., 2006]. Besides physiological costs, there are also financial costs, both direct and indirect, related to obesity. Obesity impacts the financial status of the affected individuals, their families, employers, communities, societies, and governments [Cawley J., Meyerhoefer C., 2012; George Washington University, 2010].

As stated in many sources within this paper, overweight and obese children are more likely to be overweight adults than children of average weight [CDC, 2012a]. About 75% of overweight adolescents will become obese as adults. Accord-

TABLE 4.

Orange County Districts with Highest and Lowest Percent of Students Receiving Free and Reduced Lunches 2010/2011 (Conditions of Children Report, 2011)

School District	Highest Percent	School District	Lowest Percent
Anaheim City Elementary	86	Los Alamitos Unified	10
Santa Ana Unified	84	Irvine Unified	11
Magnolia Elementary	80	Laguna Beach Unified	13
La Habra Elementary	73	Huntington Beach Elementary	16
Buena Park Elementary	73	Fountain Valley Elementary	20

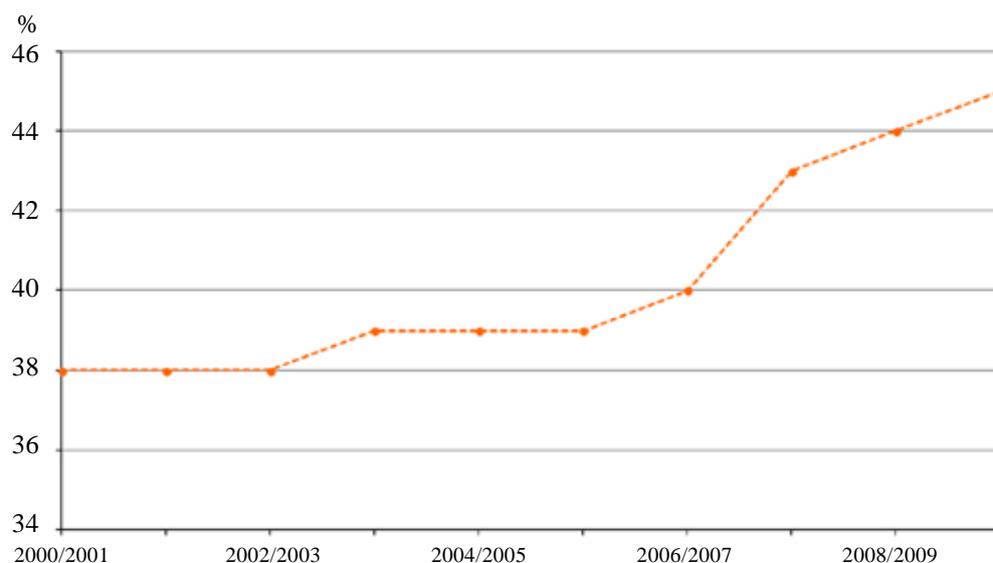


Figure 5. Percent of Students Receiving Free and Reduced Lunches, 2001-2002 to 2010-2011 (*Conditions of Children in Orange County Report, 2011*)

ing to a report compiled by the California Endowment, about 31% adolescents, aged 12 to 17, and one in three California children aged 9 to 11 are at risk for being, or are already overweight. If childhood obesity rate continues on its trajectory, the number of adults with weight issue will increase [*California Endowment, 2012*].

According to the Health Obesity Health Consequences for Childhood Obesity Report [*Alliance for a Healthier Generation, 2012*], obesity is also associated with psychological impact, such poor body image and low self-esteem. This self-perception negatively influences an obese individual's academic performance and increases his or her absenteeism rate. Unhealthy children tend to perform poorly in school, thus affecting their future and the quality of future workforce.

Leading health organizations, such as the National Heart, Lung, and Blood Institute and the Cancer Institute suggest that any attempt to successfully pause the current rising rate of obesity must include efforts that promote, encourage, and support healthy eating habits, physical activity, and a multi-faceted team approach. One such example is the Healthy for Life program. It is a public health program that reduces the prevalence of childhood obesity in certain selected neighborhoods in Fullerton, California. The Health for Life program uses the role of nutrition to encourage children and parents to improve

their dietary habits. The program specifically encourages increasing the consumption of fruits and vegetables. Moreover, the program coordinates a multi-faceted team approach. Its message is based on a consistent community-wide healthy lifestyle linked to academic achievement, family-based education, and the utilization of resources available within the community.

Obesity rates have risen markedly in Orange County in much the same way that they have increased in the rest of the State of California. The consequences and burden of these health risks do not only affect the obese individuals, but they are also borne by family members, teachers, the healthcare system, and, ultimately, the government. The need to thwart obesity is urgent. The answer may lie in the way the US and its states, over the past few decades, have steadily and successfully reduced tobacco consumption and its impact. According to some scholars and research [*CDC, 2012b*] the key component in the reduction of tobacco consumption stemmed from concentrated partnerships among public health educators, government officials, physicians, and community organizations. These effort and partnerships lasted for many years. This great example suggests that reducing obesity prevalence in Orange County may require a long-term commitment and collaboration among various institutions and individuals.

REFERENCES

1. *Alliance for a Healthier Generation*. [Health consequences of childhood obesity]. Retrieved from: <http://www.healthiergeneration.org/about.aspx?id=316> 2012.
1. *17th Annual Report on the Conditions of Children in Orange County*. Retrieved from <http://www1.ochca.com/ochealthinfo.com/docs/occp/report2011/> 2011.
2. Borrell-Carrió F, Suchman AL, Epstein RM. *The Biopsychosocial Model 25 Years Later: Principles, Practice, and Scientific Inquiry*. *Annals of Family Medicine*. 2004; 2(6): 576-582.
3. *California Endowment*. [Fighting California's Childhood Obesity Epidemic]. Retrieved from: <http://www1.calendow.org/article.aspx?id=348> 2012.
4. *California Work Opportunity and Responsibility to Kids (CalWORKs)*. [CalWorks Child Care]. Retrieved from: <http://www.cdss.ca.gov/>. 2011.
5. Cawley J, Meyerhoefer C. *The medical care costs of obesity: an instrumental variables approach*. *J Health Econ*. 2012; 31: 219-30.
6. *Centers for Diseases Control and Prevention*. [Childhood obesity]. Retrieved on from <http://www.cdc.gov/obesity/childhood/index.html>. 2012a.
7. *Coordinated Approach to Child Health*. [Coordinated School Health]. Retrieved from: <https://catchinfo.org/> 2012.
8. Cuniff, M. M. [Age, income, ethnicity: Latest Census data reveals all facts of O. C.]. *The Orange County Register*. Retrieved from: <https://www.ocregister.com/2014/12/29/age-income-ethnicity-latest-census-data-reveals-all-facets-of-oc/> 2014.
9. Daniels S. *The consequences of childhood overweight and obesity*. *Future of Children*. 2006; 16(1): 47-67.
10. Eckel, R. H., Kahn S. E., Ferrannini E., Goldfine A. B., Nathan D. M., Schwartz M. W., Smith R. J., Smith S. R. [Obesity and Type 2 Diabetes: What Can Be Unified and What Needs to Be Individualized?]. *The Journal of Clinical Endocrinology & Metabolism*. 2011. Retrieved from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3206399/>
11. *George Washington University. School of Public Health and Health Services, Department of Health Policy*. A heavy burden: The individual costs of being overweight and obese in the United States. *Medical Benefits*. 2010; 27(22), 4-5.
12. Harper, MG. *Childhood obesity: Strategies for prevention*. *Family Community Health*. 2006; 29(4), 288-298.
13. Marder, WD Chang S. *Childhood Obesity: Costs, treatment patterns, disparities in care, and prevalent medical conditions*. *Thomson Medstat Research Brief*. 2006; 291(23), 2847-2850.
14. *The Medical News Today*. [Body Mass Index (BMI)]. Retrieved from: <https://www.medicalnewstoday.com/info/obesity/what-is-bmi.php> 2016.
15. *National Center for Chronic Disease Prevention and Health Promotion (US) Office on Smoking and Health*. [Preventing Tobacco Use Among Youth and Young Adults: A Report of the Surgeon General]. *Centers for Disease Control and Prevention (US)*. Retrieved from: <https://www.ncbi.nlm.nih.gov/books/NBK99240/> 2012b.
16. *Orange County's Healthier Together*. [Orange County Health Improvement Plan, 2017-2019]. Retrieved from: http://www.ochealthiertogether.org/content/sites/ochca/oc_health_improvement_plan_2017-19.pdf 2017.
17. *St. Joseph Hospital Orange's Community Benefit Service Area (CBSA)* [Orange County Community Health Needs Assessment]. Retrieved from: <https://www.sjo.org> 2010.

18. *St. Jude Medical Center*. [FY 2012 Community Benefits Report]. Retrieved from: https://www.oshpd.ca.gov/documents/HID/Community-Benefit-Plans/2012/St_Jude_Medical_Center_Community_Benefits_Report_2012.pdf 2012.
19. *St. Jude Medical Center, St. Jude Heritage Healthcare*. [St. Medical Healthcare & St. Jude Heritage Healthcare Community benefits service area: 2010 needs assessment report]. Retrieved from: http://www.stjudemedicalcenter.org/documents/st-jude_2010_needs_assessment_6-28-2011.pdf 2010. 2010.
20. *Signorino M, Winter W. Childhood obesity and diabetes. Current Medical Literature: Diabetes*. 2008; 25(1): 1-16.
21. *Statistical Atlas*. [Race and Ethnicity in Orange County, California]. Retrieved from: <https://statisticalatlas.com/county/California/Orange-County/Race-and-Ethnicity> 2015.
22. *University of California, Los Angeles*. [Center for Health Policy Research]. Retrieved from <http://healthpolicy.ucla.edu/Pages/home.aspx>. 2012.
23. *U.S Census Bureau*. [Profile of General Population and Housing Characteristics: 2010 2010 Demographic Profile Data]. Retrieved from: <http://www.census.gov/prod/cen2010/doc/dpsf.pdf> 2010.
24. *U.S. Department of Health and Human Services*. [Childhood obesity]. Retrieved from: http://www.aspe.hhs.gov/health/reports/child_obesity/ 2012.
25. *World Health Organization* [Childhood overweight and obesity]. Retrieved from: <http://www.who.int/dietphysicalactivity/childhood/en/>. 2018.