

## **Genes Load the Gun, the Environment Pulls the Trigger: Obesity among Children and Adolescents in U.S. Schools**

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*“When the world was a simpler place, the rich were fat, the poor were thin, and right-thinking people worried about how to feed the hungry. Now the rich are thin, the poor are fat, and right-thinking people are worrying about obesity. —The Economist, December 13, 2000*

This old world isn't getting any bigger, but we are. We are getting heavier and wider; we drive bigger vehicles, live in larger homes, order “super-sized” sandwiches, desserts, and drinks. In fact, our super-sized appetite is taking a huge bite out of health budgets worldwide.

In 1998 the World Health Organization designated obesity as a global health concern. Today, 27% of American adults are obese and 34% are overweight. Research also documents the disturbing prevalence of overweight children in the United States of America.

Federal government data from 1999 to 2000 showed the percentage of overweight children between the ages of 6–11 years old jumped to 15.3% from 11.3% in just one year. Similarly, the percentage of overweight adolescents between the ages of 12–19 years old jumped to 15.5% from 10.5% in the same period.

Overweight youth are also at increased risk of Type II diabetes, cardiovascular disease, hypertension, orthopedic conditions, and respiratory problems. More worrisome, overweight American adolescents are 70%–80% more likely to become obese adults, and obese young adults die 5 to 20 years *sooner* than ideal weight people.

This sobering statistical portrait suggests that America's current political leaders are waging the wrong war, in the wrong place to save the wrong people. The next U.S. president and the new Congress should declare war on obesity to save lives on American soil—not to mention the billions of dollars saved in related health costs.

But we do not need to wait for the curtain to fall on the current defrocked American administration before we explore the dynamics of the weight gain epidemic in the U.S., especially among children and adolescents. Existing research warns us against pinning the blame on a single culprit—i.e., McDonalds' fries or Apple's ipods.

For instance, to what extent is the predisposition for weight gain passed from one generation to the next through family genes? What part of the overweight trend is fueled by poor food choices made by parents, school officials or other caregivers? And what is the impact of inadequate funding by the State for school-based health programs that target the early formative years?

**In effect, which environmental conditions can act as “triggers” for super-sized adults, families and children?**

The purpose of this paper is to examine the environmental triggers for excessive weight gain in school-age children and adolescents. The writer frames the argument with the aid of an urban metaphor – “genes load the gun; the environment pulls the trigger.” The writer will also provide an overview of the health literature for causes and possible intervention strategies aimed at curbing youth overweight and obesity in the United States. Furthermore, the investigator will also discuss “emerging issues” related to the impact of the obesity crisis on young people, issues such as crime and public safety, bullying, and “screen time.” The researcher will highlight the response of lawmakers to the health and fiscal impact of childhood obesity. Finally, the writer will offer recommendations for creating and sustaining school-based partnerships and programs.

**Constructing an Urban Metaphor for the Youth Obesity Crisis**

Even if genetic research has failed to document a direct correspondence between family genes and obesity, we still know children do inherit predispositions to many health issues through their genes. Consequently, the propensity is relatively high that a segment of American youth will become easy prey for environmental forces capable of pulling the trigger on latent weight challenges. To this end, many health researchers (P. Aspinall, 2005) have pointed to powerful triggering forces in society such as advertising, the food industry, parents, and family status. To these the writer would add peers, pop culture and school personnel (teachers, counselors, administrators, etc.).

To other health researchers (e.g., Berkey CS, Rockett HR, Gillman MW, Field AE, Colditz GA, 2003), the weight issue essentially boils down to the balance between caloric intake and physical activity to control weight gain and promote good health. Here, for instance, fast food

choices by children or their parents can feed the pipeline to obesity, largely because frequently the menus are high in calories and low in nutrients. Also, due to frenetic schedules and long commutes, many working parents can not seek opportunities for their children to regularly participate in physical activities, which are major deterrents to weight gain. Therefore, one might argue that youth overweight may be ignited by adult choices and actions/or inactions. Later in this paper, the researcher examines how other environmental triggers can ignite overweight and obesity among children and adolescents.

### **Literature on Childhood Obesity in the United States**

Scholars define an obese person as one who is 20% over the ideal weight, and overweight is considered weighing more than is normal, necessary, or allowed, especially having more body weight than is considered normal or healthy for one's age or build (World Health Organization, 2005). Overweight children are defined as children whose body mass index (BMI) is above the 95<sup>th</sup> percentile, and children at risk for overweight are those whose BMI is above the 85<sup>th</sup> percentile (Arkansas School Nurses' Role in Statewide Assessment of Body Mass Index to Screen for Overweight Children and Adolescents, (Bonnie Gance-Cleveland, April 2005).

Scholars have documented socio-cultural factors that are believed to be important in childhood weight gain, diet, and unhealthy weight control customs (Striegel-Moore, Silberstein, & Rodin, 1986). The higher frequency of obesity and lower incidence of dieting among nonwhite ethnic groups has been well documented (French & Jeffery, 1994; Kuczmarski, Flegal, Campbell & Johnson, 1994; Serdula et al, 1993, Story, French, Resnick & Blum, 1995). These findings have led some to hypothesize that ethnic differences in socio-cultural standards of attractive body weight, and body shape for girls and women, underlie observed ethnic differences in obesity and dieting (Kumanyika, 1994; Story et al., 1995; Striegel-Moore et al., 1986).

A large body of literature supports the hypothesis that black women and girls are more tolerant of overweight, diet less frequently, and perceive themselves as less overweight than white women of a similar body weight (Desmond, Price, Hallinan & Smith, 1989; Wilson, Sargent, & Dias, 1994). However, documenting ethnic differences in dieting, purging, and unhealthy weight control practices does not itself explain ethnic differences and behaviors. A large body of work

suggests that the weak dieting habits and unhealthy weight control practices of people of color are correlated with negative psychological variables and health-compromising behaviors, such as body weight dissatisfaction, low self-esteem, depression, and alcohol or tobacco use (French, Story, Downes, Resnick, & Blum, 1995).

The data on obesity in U.S. children of color indicates that overweight Chinese-American children aged 6-11 years are 31% of the population (Tarantino, 2002). The data suggest that Chinese-American children born in the second and third generations have the most significant changes in the obesity crisis, confirming an increase from 11.6% to 27.2% compared with first-generation children (Mel et al, 1998). Substantial evidence has indicated that several physical health problems, including cardiovascular diseases, sleep disorders, and type II diabetes, as well as psychosocial problems, such as low self-esteem and social withdrawal, are associated with Chinese American children's obesity (Barlow & Dietz, 1998, Young, Dean, Flett, & Wood-Steiman, 2000).

Obesity can also affect the intellectual performance of children in the United States. One report of IQ testing among obese children (e.g., Campos AL, Sigulem DM, Moraes DE, Escrivao AM, Fisberg M, 2004) measured intellectual characteristics of 65 obese children ages 8-13 in comparison to those of a control group from the same community. They observed 35 well-nourished, tall, children who fell in the 95<sup>th</sup> percentile for height and of normal weights for their height. IQ was measured using the Wechsler Intelligence Scale for Children (WISC). It was found that children with normal height and weight ratios had significantly better performance in IQ and a wider range of interests, better capacity for social adaptability, and greater speed and dexterity than those in the obese group. There was a weak correlation between income level and IQ as well.

A U.S. national study of obese kindergartners and first-graders was conducted and data collected in the 1990s (Datar, Sturm, Magnabosco, 1999). Data for this national sample of 11,000 kindergartners, and their parents, and teachers was collected at multiple time points. Cross-sectional analysis of the relationship of overweight and test scores was done at school entry. Regression analyses were performed on the data controlling for baseline test scores at school

entry. Researchers found overweight children had significantly lower math and reading scores compared to non-overweight children in kindergarten, and the differences lasted through first grade. The results could be attributed to socioeconomic and behavioral variables, indicating that overweight may be a marker, but not a causal factor, for low test scores. These studies suggest that as early as kindergarten and first grade, obesity in children has a direct and persistent impact on intellectual performance in school.

In an article, “The learning Connection: The Value of Improving Nutrition and Physical Activity in Our Schools,” scholars found that severely overweight children and adolescents are four times more likely than their healthy-weight peers to report “impaired school functioning. Overweight children are also more likely to score low on the Child Behavior Checklist (a commonly used measure of children’s behavior problems) and are twice as likely to be placed in special education and remedial classes than are children who are not overweight (Schwimmer, Burwinkle, Varni, 2003; Tershakovec, Weller, Gallagher, 1994). Also, it was found that overweight can impair school performance in many ways, including health-related absenteeism ([www.ActionForHealthyKids.org](http://www.ActionForHealthyKids.org), 2005). Among the medical conditions linked with overweight in school-aged children are asthma, joint problems, type II diabetes, depression and anxiety, and sleep apnea (National Institute of Health 2005; Journal of the American Medical Association, 1999).

Many studies have also identified strong associations between increased levels of sedentary behavior and increased levels of overweight and obesity in children and adolescents (Epstein, Paluch, Gordy, & Dorn, 2000; Hancox, Milne, & Poulton, 2004; Janz, Levey, et al., 2002; Patrick et al., 2004; Robinson, 2001). These increases in weight are closely associated with the rise in childhood type 2 diabetes, hypertension, elevated cholesterol, asthma, and several other childhood diseases (Center for Health and Healthcare in Schools, 2003; Saakslanti et al., 2004). Notably, the etiology of pediatric overweight research increasingly points to *physical inactivity* as the predominant issue, not caloric intake. In fact, analysis of federal data spanning 20 years found that among adolescents ages 12 – 17 years old, caloric intake increased only 1%, whereas physical activity decreased 13%.

Weight status among high school students is often correlated with selected physical activity, especially among adolescent boys. Yet, Strauss et al, found that children spend an average of only 12.6 minutes per day in vigorous exercise. Among teenagers – grades 9 through 12 – one-third of them do not participate in vigorous or moderate physical activity on a weekly basis, and 11.5% do not participate in any moderate or vigorous physical activity during any given week. Therefore, the conclusions expressed in the *Mayo Clinic Proceedings* seem appropriate: “We believe the evidence suggests that *declines* in physical activity are more likely than increases in energy [i.e. food] intake as the explanation for the recent increase in obesity prevalence.”

### **Emerging Obesity Triggers**

The decline in physical activity among children involves many factors: the reduction or elimination of physical education in schools; the lack of safe play space in many neighborhoods; the addiction to car transportation; and the explosion of media “toys,” which has multiplied – in tech parlance – individual “**screen time.**” For example, in 2000 American children spent an average of more than 6 hours each day using some form of personal media (television, DVD players, video games, MP3 players and computers). That was a 6% increase over the previous year. By contrast, American kids got less than **13 minutes** of vigorous exercise compared to 6.37 hours (**382 minutes**) of screen time, an astounding 30-fold difference.

The link between screen time and overweight among children is well established, having been identified almost 20 years ago. Dietz and Gortmaker found that the incidence of obesity increased 2% for every additional hour of television watched. Children with televisions in their bedrooms are at 31% greater risk of overweight or obesity. A recent Canadian study reported that more than 60% of overweight incidence can be linked to excess TV viewing time." As of 2000, nearly half (48%) of US families owned all 4 media hardware (television, videocassette recorder, video game equipment, and computers), up from 1 in 3 in 1997. The message is clear and ominous: the more kids plug in, the plumper they will become.

**Crime** is another emerging trigger to youth inactivity and excessive weight gain. Headlines daily remind us that many American youth live in a predatory environment, fueled by economic

inequality, racism, dilapidated schools and crowded living spaces. Students have witnessed or been victims of violence on school property; girls have been raped inside school buildings and on playgrounds; male youth have been abducted while walking home from school.

These incidents and other criminal acts against children have greatly limited safe spaces for them to engage in physical activity at home, school or in the community. Parents, fearing for the lives of their children, frequently forbid them to participate in extracurricular activities before or after school. This lack of free play, organized outdoor play and other physical activities has compounded the overweight phenomenon in the U.S.

The final emerging obesity trend examined in this paper is **peer victimization** of obese children. The U.S. Centers of Disease Control and Prevention (CDC) reports a four-fold increase in child and adolescent obesity in ages 6 – 19 over the past 20 years. Some 8.6 million obese American children are at risk of weight-based peer victimization, and almost 14 million adolescents are victimized due to their obesity (Georgetown University, 2002). Adolescent obesity can become more severe due to increasing isolation caused by constant verbal or physical attacks.

Weight-based peer victimization is defined as unsolicited bullying and teasing as a result of being overweight or obese. Neumark-Sztainer, Story, Hannan, Perry, and Irving (2002) found that as weight increased, so did the risk of being teased. Eisenberg (2003) reported that teasing was a common experience for boys and girls, with nearly 55% reporting that they were teased by their peers.

Most adults routinely brush off youth teasing as a normal rite of passage, so they pay little or no attention to young people's complaints about hurtful teasing from their peers. However, teasing predicts low body satisfaction, low self-esteem, increased depression symptoms, and suicidal ideation and attempts. Girls, who are more pressured than boys by society's fetish for appearance, expressed the most distress from teasing (Eisenberg et al., 2003; Neumark-Stztainer, Falkner et al., 2002).

Bullying, which is a form of physical aggression intended to harm an individual perceived to be less powerful, is common among children and adolescents. Scholars, such as Selekman and Vessey (2004), estimate 3 out of 10 American students are either perpetrators or victims of bullying behavior. The deepest stigmas left by weight-based teasing or bullying occurs at school rather than at home. Because most children and adolescents spend a good part of each weekday in school (hopefully), that's where they interact most often with peers in large group settings. That also makes schools the ideal venue to address various forms of weight-based victimization. As we will see in the next section of this paper, schools can play a primary role in the national effort to prevent and to rein in youth overweight and obesity.

### **Hanging On: Schools Battle Cutbacks, the Bulge & Mandates**

With more than 95 percent of American youth 5 – 17 years old enrolled in school, no other American institution has as much continuous and intensive contact with children during their first two decades of life. Schools can promote good nutrition, physical activity, and healthy body weight among millions of children through meal programs, physical education programs and recess, and classroom health education, as well as through other school health services. But many school administrators, educators and health practitioners are under siege, trying to do more with less. We will examine the challenges they experience as the youth weight crisis waddles through school corridors every day.

### **Nutrition**

Even though the evidence that child obesity affects school performance is skimpy, we do know nutrition clearly affects academic performance. No surprise then that 99% of all public schools and 83% of all private schools participate in the National School Lunch Program. The School Breakfast Program is offered in 78% of the schools that offer the lunch program (Fox, Hamilton, Lin, 2004). Meals in both programs must meet federally defined nutrition standards for schools to be eligible for federal subsidies, both cash and commodities.

Most U.S. school-aged children eat a large share of their daily food intake while they are in school, with estimates ranging from 19 - 50% or higher. But nutritious meal programs have been

compromised by budget pressures. School food service programs, once regular line items in local school budgets, now must often be completely self-supporting and cover costs of food, labor, and other expenses, such as equipment, utilities, and trash removal. Federal reimbursements and revenue from food sales are their principal sources of funds.

Schools now also offer “competitive foods” sold in vending machines, as a la carte offerings in the cafeteria, and at snack bars, school stores, and fundraisers. ([www.healthyamericans.org](http://www.healthyamericans.org), 2005). Although reimbursable school meals must meet federal nutrition and dietary guidelines, competitive foods have no such requirements. Furthermore, even though the federal school meal programs set appropriate portion sizes, “competitive foods” follow no size guidelines. Twenty ounces of soda, for example, is the standard size in many school vending machines.

The availability of high-fat, high-sugar foods and beverages in school creates a food environment that invites excess energy intake and excess weight gain. The national School Health Policies and Programs Study (SHPPS) 2000 found that 43 percent of elementary schools, 74 percent of middle schools, and 95 percent of high schools have vending machines, school snack bars, or other food sources outside of the school meal programs.

### **Activity**

As noted earlier in this paper, the recent climb in youth obesity rates is more likely due to declines in physical activity than to increases in caloric intake. When American children and adolescents spend less than an average of 13 *minutes* a day in vigorous exercise compared to an average of more than six *hours* in front a screen (television, computer, DVDs, etc.), it is not hard to see the need for physical education classes in schools.

However, because federal legislation now puts greater emphasis on academic performance in schools, school administrators are faced with difficult choices regarding the need to cut non-academic activities in school to provide more time for academic instruction. Ironically, recent studies (e.g., M. Fogelholm et.al, 1999; M. T. McGuire et al, 2003) consistently show that increased physical activity in students is associated with better academic performance in school.

Yet, physical education requirements decline drastically as students advance in grade levels. The share of schools requiring physical education classes has dropped from around 50% in grade 8 to only 5% in grade 12 (Burgeson, 2005). Even worse, the share of students who attend PE classes daily has fallen from 42% to 28% (Burgeson, 2005). This perfect storm of new academic mandates, tight budgets and unhealthy food options in schools is setting up a new surge in youth obesity in America.

### **State Policy: Responses to the Youth Obesity Crisis in the U.S.**

Increasingly, state-level policymakers in the U.S. are taking action to trim the waistlines of school-age children. For instance, 40 state legislatures have introduced numerous measures with the intent to create a healthier and more active school environment for children and adolescents. Generally, they are either setting nutrition standards for “competitive foods” or raising requirements for health and physical education curricula.

### **Nutrition**

For instance, the state of California has adopted policies to establish explicit school nutrition standards that limit items available to students during school hours. Arkansas has banned in-school access to vending machines. Colorado lawmakers have enacted a measure encouraging local school boards to require at least 50% of vending machines items meet specific nutritional standards. The State Board of Education in Tennessee has required all schools to establish minimum nutritional standards for competitive food items sold to students (e.g., candy bars, potato chips, cookies, doughnuts, soda beverages).

Local school boards have joined state governments in taking a pro-active approach to regulating nutrition standards in school food programs. For example, school boards in Philadelphia, New York City, and Los Angeles no longer allow soda beverages to be sold. Chicago schools now face restrictions on vending machine items.

### **Physical Activity**

State legislators are also sponsoring more policy initiatives that foster greater physical activity among children in school. The New Mexico legislature has commissioned a study to determine the effect of a lack of physical and health education classes provided in schools. Lawmakers in the state of Louisiana have set specific standards for health or physical education classes, requiring students to spend a certain number of hours during the school day in physical activities.

Some states are examining the idea of measuring each student's body mass index (BMI) and treating this as a health report card to be sent home along with the academic report card. For instance, in 2003, Arkansas Governor Mike Huckabee signed legislation that required schools to send parents *health report cards*, along with academic reports, which would provide information on a student's health status, specifically a student's BMI. A study found that of the 450,000 students attending Arkansas' public schools, 22 percent were considered overweight and 18 percent were at risk for being overweight. Other states like Connecticut, Iowa, Indiana, and Washington have introduced similar legislation calling for BMI assessments of students. New Mexico has initiated a study to examine the feasibility of implementing fitness report cards.

The pro-active response at the state level to the growing American youth weight crisis is welcomed but not sufficient to defuse the problem. Several factors must be considered. First, since there are no federal standards or mandates for physical or health education programs, the implementation of requirements, restrictions or recommendations by state and local boards of education vary widely. Even where lawmakers have introduced measures to set statewide standards regarding nutrition, physical activity or health education of children, many of these measures have stalled due to implementation costs. Furthermore, the growing drumbeat for tougher academic standards has made it difficult for to gain support for obesity intervention at the local school level.

In fact, in some states, policymakers are also placing greater onus on citizens for poor health decisions by limiting their ability to pursue obesity-related lawsuits. This legislation is often referred to as "commonsense consumption acts," which limit the civil liability of manufacturers, distributors, sellers, or retailers of food or beverages. These laws restrict the ability of individuals to sue for damages resulting from weight gain, obesity, or obesity-related conditions. In 2003, Louisiana became the first state to enact a Commonsense Consumption Act. While the trend is

gaining ground, only 10 such restrictive measures were signed into law out of the 26 states where Commonsense Consumption Acts were introduced in 2003. The legislation was vetoed in the state of Wisconsin.

It would be irresponsible for this writer not to raise the impact of recent federal health policy and the negative role of the insurance industry in helping families and schools cope with health issues related to youth overweight and obesity. Between 1998 and 2004, the number of uninsured children fell every year under the State Children's Health Insurance Program (SCHIP). But since 2004, progress in enrolling uninsured children in SCHIP and Medicaid has stalled as funding for SCHIP expansion has tightened and Medicaid restrictions have proliferated (other factors very likely contributed to this outcome, as well).

The Center on Budget and Policy Priorities (2007) reported that the number of uninsured Americans rose for the sixth consecutive year in 2006, to 47 million citizens. The number of uninsured children rose for the second straight year, to 8.7 million, according to 2007 Census data. One can only concur with the recommendation of Robert Greenstein, executive director of the Center on Budget and Policy Priorities: "The new Census data underscore the need for Congress to complete work on — and the President to sign — a strong SCHIP reauthorization bill before the program expires on September 30 [2008]." This writer would go even further and call for universal health care for all Americans, but especially for the 8.7 million uninsured children whose dreams can be cut short due to unattended health issues like chronic weight gain or obesity.

## **Recommendations**

1. Numerous groups in U.S. society are beginning to address the childhood obesity epidemic. However, many of these well-intentioned singular efforts should become partnerships that more effectively approach youth obesity as a public health problem, demanding a holistic, sustained and coordinated response.
2. All stakeholders should ensure health and wellness dollars and personnel reach the school level to help children in need.

3. Lawmakers and school boards should revise funding formulas to guarantee children get quality school health programs, healthy choices in cafeteria food and all “competitive foods,” and more mandated physical education in the curricula.
4. If children are to take responsibility for their own health and wellness, school level curriculum personnel must urgently begin offering classroom subject matter and physical education courses with equal attention given to both.
5. Parents must be encouraged and trained to continue the school’s emphasis on health and wellness at home.
6. Social service organizations must work as partners with school personnel to create programs that offset limited funding for health programs in schools.
7. Physical education classes must be offered at critical times during the school day, not just at the end of the day, when children are more focused on home activities, jobs or other extracurricular activities.
8. Advocacy groups, such as health care professionals, must form partnerships with food and advertising executives, yet remain committed to children’s health.
9. Food and advertising executives should recognize the wisdom and profit in offering school food programs with healthy options.
10. Finally, teachers must be provided the incentives and means for pursuing professional development training to effectively help overweight youth who suffer peer victimization.

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