Farm, Food, Health: How Public Policy Affects Childhood Nutrition

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Some have used the term "toxic environment" to describe the current climate of poor nutrition and physical inactivity in which children are being raised. Inexpensive, calorie-dense, and oversized food and beverage servings are readily available in nearly every public place, including schools. Children are continuously reminded of the desirability (in terms of both taste and social status) and availability of these foods through companies' widespread and creative marketing strategies. Meanwhile, children remain unexposed to healthier food options. Factors such as physical activity, heavy automobile traffic, lack of sidewalks, fear of crime, increased television time, and reduced physical activity have converged to provide children far fewer opportunities to engage in physical activity than in the past.

Improving children's nutrition will require change at the national, regional, and local levels. In this article, we address the nutritional aspects of the obesity epidemic and the role of public policy in revising agricultural, food marketing, and school practices. From our research, we know that the confluence of events and circumstances responsible for the obesity epidemic has an even greater adverse impact on vulnerable and underserved populations. Policy can

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play a critical role in creating a national environment that promotes proper nutrition for children.

The Obesity Epidemic

Currently in the United States (US), it is the norm to be overweight, with 66.3% of adults considered either overweight or obese.[1] This health crisis is also prevalent among the younger population as the percentage of children aged two to nineteen considered at risk of being overweight or obese has risen from 28.2% in 1999-2000 to 33.6% in 2003-2004.[1] The impact is even more prominent in poorer communities: adolescents from low-income households are twice as likely to be overweight or obese as their counterparts from middle- and high-income households.[2]

This nationwide epidemic has far-reaching implications, as childhood obesity poses both immediate and long-term health consequences. Being overweight during childhood has been associated with hypertension, dyslipidemia, and Type-2 diabetes. As popular culture often stigmatizes obesity, the risk of experiencing psychosocial problems such as depression, poor self-esteem, and poor quality of life is also present.[3,4] The obesity epidemic has also negatively impacted the nation's economic status. Obese adults incur annual medical expenditures that are, on average, nearly 40% higher than adults with a normal body mass index (BMI).[5] Total annual health care expenditures for overweight and obese American adults have been estimated to range from approximately $98 to $129 billion.[6,7] With Medicare costs related to obesity jumping from 9.4% in 1987 to nearly 25% in 2002, the federal government—and thus taxpayers—shoulder much of this economic burden.[8] In addition, the chronic nature of many obesity-related diseases ensures that the medical costs of caring for overweight children will persist into adulthood. The health and economic consequences of the obesity epidemic make it increasingly urgent that Americans develop local, state, and federal polices to address the environmental effects of this growing public health issue.

The nutritional environment for children is determined by what food is available, how it is marketed, and how their primary environments either facilitate or create barriers to good dietary habits. This article focuses on the influence of agricultural policy on food availability, the role of food marketing to children, and the degree to which school policy can help create a less toxic and more nurturing environment.

US Agricultural Policy

National US agricultural policy has historically been focused on producing ample food supplies and ensuring economic stability in the farming sector. It has been extremely successful in achieving this goal. In fact, US agricultural output increased 260% from 1948 to 2002[9] and the net farm income in 2004 was a record $82.5 billion.[10] When US agricultural policies were first developed, their intent was to solve dietary problems related to nutritional deficiencies and rapid population growth that demanded a plentiful food supply.[11] However, as health risks among Americans have shifted from under-nutrition to excessive intake, these policies have

contributed to the growing epidemic of obesity by encouraging the overproduction of food commodities and diminishing incentives for the production and consumption of healthy foods.

Farm subsidies are the most publicized and well-known agricultural policy in the US. Subsidies come in the form of commodity payments (income support programs that consist of direct cash payments to farmers based on crop type, acreage and crop prices),[12] conservation programs and disaster relief. Subsidies have constituted a significant financial outlay, totaling $143.8 billion between 1995 and 2004.[13] Other policies, such as investment in agricultural research and education, marketing assistance, preferential tax policy, market regulations and trade policies, have also boosted agricultural production.[14] When added to the indirect benefits of government building and maintenance of infrastructure essential to the agricultural business (i.e. flood control, rural roads), this package of support and incentives along with abundant natural and human resources has created the world's most prolific agricultural producer.[11] The US ranks as one of the top four producers of all fifty crops monitored by the United Nations (UN) and the top producer of major commodities such as meat, poultry, soybeans and corn.[15]

This abundance in agricultural production has created a surplus of food in the US. The USDA Economic Research Service has determined that calorie availability per capita, per day, reached an all time high in 2000 of 3,900 calories, up 20% since 1982.[16] Comparing this figure to the USDA estimated energy requirement of 2,400 calories per day for an active 30-year-old male illustrates the current food surplus.[17] This production surplus has stimulated a marked increase in food availability and in delivery systems such as the fast-food industry. According to the 2002 census, there are over 228,000 fast food eating establishments in the US.[18] These establishments, which are especially popular among the adolescent population, generally serve energy-dense, low-micronutrient foods that may lead to obesity.[19,20]

Agricultural policy has an effect not only on the overall volume of food production, but also on the types of foods produced. Under the farm subsidy program, farmers are subsidized with cash payments for planting a limited range of crops as established by the federal government. These payments are determined by the number of base acres for a certain crop and, in some cases, by the market price of the commodity. Since subsidy payments are concentrated primarily on corn, wheat, soybeans and rice, growers of these commodities receive more than 90 percent of total farm subsidies.[21] As a result, food manufacturers have concentrated on ways to "add value" to these crops in order to increase the profitability of food sales. In turn, this has led to an increase in the supply of added fats, added sugars, and refined grains to manufacturers. Agricultural policy has a direct effect on these additives because they are all products of subsidized commodities. High fructose corn syrup (HFCS) is a major added sugar in the US food supply and is produced from processed corn. Added fats are produced from soybeans through hydrogenation. Refined grains are a commonly processed form of wheat and rice crops. All of these products are found in a variety of popular packaged foods as well as in many items where consumers do not

expect them, such as bread and ketchup. These factors drive American consumption of large amounts of value-added products produced from commodities. The USDA's 2002 report on US per capita food supply trends reported that US consumers are eating not only too many refined grains but also are substituting them for healthier whole grains and fiber rich foods. Added sugar consumption in 2000 was nearly triple what the dietary food pyramid recommends, and US consumption of added fats rose 35% between 1970 and 2000.[16] In addition to these value added products, inexpensive corn-based feed used by industrial animal producers has created a large supply of cheap meat.[22] Not only do these policies create incentives to produce unhealthy foods, but subsidized farm commodities themselves are crowding out other more healthy crops such as fruits and vegetables by limiting the amount of investment directed toward bringing them to market. All of these trends are in direct conflict with the USDA's nutritional guidelines, which advocate a diet low in added fats and sugars and higher in whole grains and vegetables.

Another consequence of overproduction is downward pricing pressure on foods. The percentage of disposable income used for food by Americans averages less than 10%, the lowest in the world.[11] Food supply issues also intersect with detrimental consumer pricing incentives. In addition to the overall cheapness of American food, the USDA has reported that whole grain versions of analogous refined grain products are one third higher in price.[16] Furthermore, fresh fruit and vegetable prices have increased 118% between 1985 and 2000 compared to a more modest increase of 20% to 46% for energy-dense, nutrient-poor foods and beverages.[23] These price effects have a demonstrable consequence on consumption: it has been shown that 50% price reductions of fruits and vegetables in school cafeterias results in two to four fold increases in sales of those items.[24] The combination of easily accessible and inexpensive, energy-dense food coupled with expensive items of higher nutritional value has created a purchasing environment that encourages poor nutrition.

There are significant barriers to implementing changes in US agricultural policy. The US agricultural sector holds unequaled political power through the "gold triangle" of congressional appropriations and legislation, USDA-led execution of programs, and intense lobbying power.[25] Although many reforms based on economic reasons have been advocated, the political power of the agricultural regime has maintained and even increased the amount of available subsidies. There is also a lack of support from the American public for changing current agricultural policy. The average consumer considers the plentiful supply of inexpensive food to be a positive aspect of American economic prosperity and does not necessarily link obesity to agricultural policies.[26] Moreover, public attitudes about obesity tend to focus the debate on individual behaviors as opposed to environmental conditions. Coupled with a long-standing, erroneous assumption that subsidies are used to support culturally valued small farmers, these factors create a difficult environment for mobilizing public opinion in favor of reform.

Despite the political challenges inherent in changing an entrenched system, there are several clear policy steps that should be

taken in order to counteract the negative incentives currently built into agricultural policy that promote energy-dense diets and obesity. One initiative that is gaining momentum involves forging connections between local agriculture and consumers. Numerous programs such as farmers markets, food co-ops, U-pick farms, and food policy councils are establishing a direct link between farmers and customers.[27] There is encouraging evidence that such programs have growing market demand and can successfully encourage the substitution of mass produced food. For instance, there were over 3,700 farmers markets in the US in 2004, a 111% increase since 1994.[28] This concept can also be applied to wholesale-level solutions whereby businesses, schools and other organizations can buy directly from local agriculture producers. Such programs already exist in many areas, most notably as a part of farm to school initiatives such as DOD Fresh, which uses government military procurement systems to deliver fresh agricultural products to schools. In these programs, schools purchase and prepare farm-fresh foods such as fruits and vegetables, eggs, meat, and beans. Often, students have opportunities to learn through farm visits, gardening and recycling programs. These programs not only provide farmers with access to a new market, but also strengthen ties to their community by educating children about local food and sustainable agriculture.[29] Stronger local connections between farmers and wholesale and retail customers could increase the availability and lower the prices of whole grains, fruits and vegetables, which in turn would have a positive effect on public health. Through marketing, economic support, and coordination, these programs should be encouraged by local, state and federal government with particular emphasis in underserved communities that have the least access to fresh fruits and vegetables.[30]

A second policy strategy is creating economic incentives that encourage the production and consumption of healthier foods. In order to stimulate the production of healthier crops, subsidy policy should not only lower subsidies for the current dominant commodities, but also create a level playing field by subsidizing fruits and vegetables. A larger supply of these items would make them more affordable and, thus, more desirable to American consumers.

Although often labeled as regressive, the use of food taxes to discourage the consumption of energy-dense foods such as soft drinks, candy, and snack foods should also be considered. These taxes currently exist in several states and can have significant effects on consumption. In California, the imposition of a snack food tax in 1991 led to an estimated 10% drop in sales.[31] Additionally, these taxes can generate large amounts of state revenue toward funding health initiatives. It is estimated that soft drink and snack food taxes in eighteen states and one major city raised $1 billion per year.[32] However, any attempt at policy changes will require the cooperation of numerous groups including small farmers, community leaders, government and businesses. With the opportunity to shape the upcoming farm bill, a concerted effort should be made to combine similarly aligned constituencies and to advocate for better agricultural policy geared towards sustaining local agriculture as well as improving health.

Children and Food Marketing

Overall, it is estimated that $10 billion per year is spent in the US on food and beverage marketing to children.[33] In 2005, the food industry spent roughly $1 billion of their $5 to $6.5 billion total budget on television advertisements targeting young consumers.[33] Furthermore, highly processed and packaged foods tend to have the largest amount of advertising dollars directed toward them.[34] Given the significant resources being allocated to marketing less healthy foods and beverages to youth, the content of marketing messages and children's exposure to them are critical policy issues in the battle against childhood obesity.

Marketing is conducted mainly through advertising (both traditional and non-traditional) and trade promotion. The most visible forms of traditional advertising are television, radio, print/press, and outdoor billboards.[35] Of these, television is the most important medium of advertisement for the food industry (food is the most frequently advertised product on television)[33] and is used extensively for the promotion of food products to children. It has been estimated that children watch 40,000 commercials each year[36] and view a food advertisement every five minutes of television time.[37] Although less visible than advertising, trade promotion receives a majority share of food company marketing budgets (55% as opposed to 25% for television advertising).[38] In addition, trade promotion targets retailers such as convenience and grocery stores in an effort to increase in-store displays and shelf-space through positioning agreements and incentives like buy backs and sales contests that increase sales of certain products.[33]

Although traditional advertising and trade promotion are key elements in food marketing, new vehicles are growing in importance. These non-traditional venues are varied and emerging in areas such as the Internet, industry-sponsored contests, product placement, in-game advertising, sales promotion and school-based marketing. Non-traditional forms of advertising and marketing offer innovative ways for companies to establish brand loyalty and relationships with young consumers. For instance, using the Internet provides companies targeted, direct-marketing opportunities to children and teens through tracking. Many websites require registration with personal information, with which companies can develop one-on-one relationships. Food companies also use industry-sponsored contests and incentives to promote unhealthy foods.

Product placement, which is the paid inclusion of branded products or brand identifiers in various media venues, represents another emerging force in marketing, as evidenced by the Coca-Cola Company's recent $20 million purchase for product placement on American Idol.[39] Music is another emerging venue for industry sponsorship to reinforce products through lyrics of popular hip-hop songs and music videos.[40] In-game advertising (product placement during video games) has been an established mode of advertising for the past twenty years. However, the enormous increase in the popularity of gaming (the average young man plays 12.5 hours of videogames each week compared to watching ten hours of television)[41] has reversed

this business model. Many videogame manufacturers now sell product placement to companies as opposed to paying companies for use of their logos. This form of advertising generates substantial revenue (estimated at $134 million in 2002), demonstrating that advertisers are eager to increase their visibility with this growing audience.[42]

Marketers have also found their way into the school environment. School-based marketing utilizes billboards and signs in school corridors or sports facilities, contracts or other arrangements between districts and fast-food companies, and corporate logos or brand names on school equipment (e.g. scoreboards). For example, in Pizza Hut's Book-It Program, children in grades K-6 receive a free personal pan pizza when they meet monthly reading goals set by academic institutions.

These extensive marketing tools have a significant effect on nutrition among children nationwide. According to the 2006 Institute of Medicine (IOM) report on Food Marketing to Children and Youth, there is strong evidence that demonstrates that television advertising influences the food and beverage preferences and requests of two to eleven year olds. In drawing attention to a certain product's brand name and perceived desirability, the food industry is vigorously undercutting the public health message. Harrison and Marske found in 2005 that 83% of food and beverage television advertisements aimed at children showcased fast foods and sweets.[43] Of the $7 billion spent on food advertising in 1997, 22% was dedicated to prepared, convenience foods, while 15.5% was dedicated to confectionary and snacks (gum, cookies, chips, and other snack items).[34] During the same time period, fruits, vegetables, grains, and beans received 2.2% of advertising expenditures.[34] Although it has been difficult to infer causality between television advertising and child and youth adiposity due to other external factors such as decreased physical activity and snacking behavior associated with watching TV, there is strong evidence that exposure to television advertising is associated with obesity in children and teens aged two to eighteen years old.[33]

Attempts to regulate and restrict youth marketing in the US have had mixed results. In 1978, the Federal Trade Commission (FTC), heeding recommendations that advertising to young children was unfair and deceptive, proposed a rulemaking process called "Kidvid," which would either restrict or ban advertising to young children as a protective measure.[44] In 1981 the Supreme Court overturned this legislation citing that there were no clear definitions of what foods should and should not be advertised and "Kidvid" would be "more extensive than necessary."[44] Then, in 1990, there was a marginal policy success with passage of the Children's Television Act, which limited the amount of commercial time during children's programming to 10.5 minutes per hour on weekends and to twelve minutes per hour on weekdays.[45] Given the limited federal regulation on advertising to children, the majority of the current regulatory effort in the US is self-imposed by the industry through the Children's Advertising Review Unit (CARU), which was established by the National Advertising Review Council (NARC). CARU's goal is to advance truthfulness, accuracy, and consistency in advertising through internal monitoring

and reviewing.[46] This type of self-regulation raises concerns given that the program is voluntary and does not establish or enforce specific rules on food marketing. Considering the probable connection between marketing and childhood obesity, the government and the industry must negotiate a more comprehensive and robust policy solution to address the amount and content of food marketing messages.

School Nutrition Policy

Wellness policies can provide schools with the support needed to address the rising obesity epidemic by promoting healthy nutrition and physical activity. Studies have demonstrated that the promotion of proper nutrition and sufficient exercise in schools is associated with improved academic performance, school attendance, and classroom behavior.[47-50] Schools are a critical environment to address children's health, as over 53 million students are currently enrolled in the US school system.[51] Furthermore, students spend a large portion of their day in academic settings; as a result, they consume many of their calories on school grounds. Therefore, the school environment may be an ideal setting to promote and teach lifelong healthy habits. The IOM Committee on Childhood Obesity believes that schools offer many opportunities to teach the practice of healthy behaviors and recommends that "[schools] should provide a consistent environment that is conducive to healthful eating behaviors and regular physical activity."[52]

School nutrition policies are urgently needed, as the quality of children's diet is declining. Fruit and vegetable intake has dropped continuously in the last three decades with less than a quarter of children consuming the recommended number of servings in recent years.[53] At the same time, only 2% of school-age children meet the USDA's five main recommendations for a healthy diet.[54] For example, milk consumption has dropped by 30%.[55] Milk may have been replaced by soft drinks, as approximately one-third of male and female teenagers consume an excess of three soft drinks on a daily basis, the equivalent of 30 teaspoons of sugar and an additional 450 calories per day.[56] Ludwig and colleagues examined the relationship between sugar-sweetened drinks and body weight and found that for each additional serving of sugar-sweetened drink consumed per day for a period of nineteen months, both BMI and the number of obesity cases increased significantly in school children.[57]

School wellness policies that follow the Centers for Disease Control recommendations for school-based healthy eating programs have demonstrated positive health impacts.[58] An effective wellness policy for students should be comprehensive, focusing on restricting non-nutrient dense foods, as well as on promoting healthy foods.[58]

In recent years, there has been a flurry of school nutrition legislative activity. The Child Nutrition and WIC Reauthorization Act of 2004, for example, requires local public school districts to develop and implement wellness policies beginning in the 2006-2007 academic year in order to receive federal reimbursement for free and reduced school lunch options. The policy initiatives focused on nutrition among children include:

- Establish nutritional standards for foods and beverages sold in schools.
- Restrict access to and sales of competitive foods and beverages.
- Increase and promote access to fresh produce in schools.
- Develop model policies and programs.
- Establish school wellness committees, councils or task forces.
- Encourage state and local education officials to take action.[59]

Various strategies and interventions have been used to promote the development of policies and to support a healthier school nutrition environment. One strategy calls for an increase in the availability of fruits and vegetables to children in schools. School gardens, salad bars in the cafeterias and farmers' markets have all been integrated into school meal programs to promote student consumption of fruits and vegetables.[51,60,61]

Limiting the accessibility of "competitive foods" (which tend to be high in fat and low in nutrients) is also an important aspect of promoting a better nutritional environment. As such foods are often available in vending machines, limiting access to these foods could be accomplished by restricting use of vending machines during certain times of the day. In addition, stocking vending machines with healthier options such as pretzels, fruit and nuts could encourage healthier habits. Price modifications, which include slight increases in the cost of high-fat foods and modest decreases of lower-fat foods' prices could be another strategy in encouraging healthier foods choices in the cafeterias. Taste, perceived value (price and portion size) and perceived nutrition seem to be the main determinants for food choices;[62] therefore, considering these determinants while offering more nutritious products could lead to improved nutrition.

While support for a healthier school environment for children seems logical, a variety of economic, political, personal choice barriers threaten to derail school wellness policies. For example, schools are compelled to raise funds to support many important functions, sometimes through contractual agreements that allow the sale of "competitive foods" to students via vending machines, à la carte items, snack bars and fundraisers.[63] Because financial incentives are directly linked to the sale of beverages and food products, both schools and vendors have an interest in increasing the amount of competitive foods that students purchase.[64] Unfortunately, this often pits economic interests against the school meal program and its nutrition goals. Given the requirements associated with high-stakes testing and the No Child Left Behind Act, many school officials now view nutrition policy as yet another unfunded and time-demanding mandate.[65] More research is needed to demonstrate evidence of positive impacts associated with implementing wellness policies to convince school administrators of the potential value.[65]

An additional barrier affecting the adoption of health and wellness programs is that policies concerning nutrition and physical education typically do not elicit enthusiasm from all members of the school. Wellness policies are often seen as the responsibility of the food service staff, physical education teachers and the school nurse or health teacher. It is important to

advocate for members from all levels of the school community, including parents and children, to be involved and to provide input and guidance during the development and implementation process in order to promote a sustainable wellness program and policy.

Conclusion

Given the breadth and scope of influences that have converged to create the obesity crisis, it is easy to become discouraged by the current epidemic. Focusing on the level of individual responsibility and behavioral changes, by expecting families to shelter their children from outside pressures or relying on children to make healthy decisions in a toxic environment of cheap and abundant calorie-dense and nutrient-poor foods will not be sufficient for true improvement. The opportunities will be greater if we track and understand the factors contributing to the obesity epidemic and implement policies that foster an environment which supports wiser nutrition and physical activity choices.

Weekly news stories and publicity have made nearly everyone aware of the magnitude of the problem and the health risks associated with childhood obesity. This increased consciousness has made it possible to pass legislation and produce regulations that would not have been possible just a few years ago. Carefully designed and focused policies are needed, particularly in the areas of agriculture, marketing, and school nutrition, as we have outlined. However, simply creating new policies for childhood nutrition will not be enough. We must evaluate potential adverse impacts of existing policies and design innovative and practical approaches to the policy implementation process.

Agricultural policies have long focused on inexpensive food as the highest priority. As we have discussed, implementation of these policies has contributed significantly to the availability of low-cost, calorie-dense foods. Additional unintended and adverse consequences include the demise of local agriculture and the increased dependence on fossil fuels for pesticides, fertilizers and cross-country food distribution. Perhaps it is time to question whether policies designed to generate cheap food in great abundance are in our best interest for the long-term.

Considering that public resources cannot be expected to match the food industry's spending on marketing, any successful policies to reduce the negative influence of food marketing must focus on partnering with the food industry itself. Some recent acts by the industry such as the voluntary removal of soft drinks from elementary and middle schools and the development and promotion of healthier foods to serve a growing market are positive developments. New policies should capitalize on this nascent recognition from the food industry by creating regulations that encourage food companies to expand these efforts. To the extent that this shift does not correct the existing imbalance between healthy and non-healthy promotion of foods, stronger government regulatory action should be taken. The government should develop policy including the prohibition of deleterious food marketing to children, a model that has precedent in the regulation of the tobacco industry.

Schools are under increasing pressure to

address a number of social problems with little or no additional financial support. In addition to a string of demands related to high-stakes testing and No Child Left Behind, school nutrition programs in many states have been saddled with generating revenue. This situation creates resistance to policies that could improve nutrition in school lunchrooms but whose impact is considered economically unviable. Carefully designed and creative policies could reduce this resistance by generating support and buy-in through social marketing before trying to impose a potentially unpopular regulation or policy. More importantly, state and local policies that prohibit school systems from requiring the child nutrition programs to pay overhead would give these programs more flexibility.

Just as polluted air and water cannot be cleaned up overnight, policy efforts to help reverse the epidemic of childhood obesity must address the problem in small but collective steps. The toxic or obesigenic environment has been developing for many years and will take time to reverse. Policies in other areas of public health, such as smoking cessation, have ultimately had a much greater impact than individual behavior change interventions alone. However, difficult-to-enforce policies designed to impose behavior change on an unwilling population are unlikely to succeed. Policies related to nutrition will likely be most effective if they make it easier for families and children to make healthy choices. Agricultural policies that support healthy eating habits, a government/industry partnership that corrects the overwhelming imbalance of negative food marketing to children, and school nutrition policies that are determined by sound nutritional knowledge instead of economic forces would all be steps in the right direction. 

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