The economics of obesity\textsuperscript{1–4}

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ABSTRACT

The rise in obesity rates, both nationally and internationally, is a result of changes in the environment that have simultaneously lowered the cost of food production, lowered the time and monetary cost of food consumption, increased the real cost of being physically active at work and at home, and decreased the health consequences that result from obesity by bringing a host of new drugs and devices to the market to better manage the adverse health effects that obesity promotes. This changing environment is in response to consumers’ demand for labor-saving technology and convenient, affordable food. To be successful, efforts to combat obesity therefore need to recognize and address these realities. Am J Clin Nutr 2010;91(suppl):1520S–4S.

INTRODUCTION

Obesity rates in the United States have more than doubled in the past few decades. Between 1960 and 1962, only 13% of the US population was obese [body mass index (BMI; in kg/m\textsuperscript{2}) \( \geq 30 \)] (1). By 2004 the prevalence of obesity had increased to 32%, roughly the same as it is today. Although historically obesity has hit low-income Americans the hardest, the gap in obesity rates between the richest and poorest Americans has narrowed sharply in recent years. In fact, the largest increase in obesity over the past few decades occurred among Americans who live 200% above the poverty line (1), which suggests that obesity’s reach stretches broadly across the socioeconomic spectrum.

The obesity epidemic is not only an American phenomenon. In 2005 the United Nations’ World Health Organization estimated that 1.6 billion people, or roughly one-quarter of the planet’s population, had a BMI above the normal-weight range (>24.9 for adults and above the age/sex-adjusted 85th percentile for youth). This estimate includes \( >22 \) million children under the age of 5 y. In the United States, from 1976 to 2006, childhood obesity (age/sex-adjusted BMI above the 95th percentile) increased from 5.0% to 12.4% in children aged 2–5 y old and from 6.5% to 17.0% in children aged 12–19 y (3).

Because even recent historical data on obesity trends are unavailable outside the United States and Western Europe, it is difficult to quantify the change in obesity rates for much of the world. Where data are available, results show that many countries have seen larger increases in obesity rates over the past decade than that seen by the United States and some evidence indicates that rates of childhood obesity are growing fastest in lower-income countries (4).

As discussed below, there is overwhelming evidence that obesity increases the risk of many adverse health conditions. Although the increase in health risks is borne entirely by the obese individual, the costs of the treatment of obesity-related diseases are shared. For example, in the United States, obesity has been estimated to cost as much as $147 billion per year (5); roughly one-half of this total is paid by the government (ie, taxpayers) and the other half is paid by private insurers, which suggests that taxes and employee premiums (for all employees regardless of weight) finance much of the costs of obesity. Therefore, governments, employers, taxpayers, and employees all have significant motivation to contain the rising rates of obesity, if for no other reason than to save money. However, to rein in rising obesity rates successfully, it is first necessary to understand the underlying causes of the increase.

THE ROLE OF ECONOMICS IN RISING RATES OF OBESITY

Economics is at the heart of the obesity epidemic. Economic forces have made it easier and cheaper to consume high-energy, tasty, affordable foods and have allowed us to be increasingly sedentary at work, at home, and in between. Moreover, medical advances have lowered the health costs (ie, consequences), if not the financial costs, that result from excess weight, and have perhaps decreased the motivation to diet and exercise. In other words, the rise in obesity rates is a direct result of changes in relative prices (or costs) that promote excess food consumption and inactivity and that decrease the motivation to engage in health-seeking behaviors.

Food consumption

One of the basic tenets of economics is the inverse relation between price and quantity demanded. As prices decrease, quantity demand is expected to increase. Demand for food is no exception. During the past several decades, food prices have been steadily dropping. Since 1978, food prices have dropped 38% relative to the prices of other goods and services (6).
Even more relevant, high-calorie foods have become much cheaper than more healthful alternatives (7). US data show that since 1983 the price of fresh fruit and vegetables has increased by 190%, all fruit and vegetables by 144%, fish by 100%, and dairy products by 82%, whereas the price of fats and oils, sugars and sweets, and carbonated beverages, for example, increased at much lower rates (70%, 66%, and 32%, respectively), which suggests that the relative prices of associated foods have decreased (8). Much of the decrease in relative prices is a result of advances in food technology that disproportionately affect processed foods (eg, freeze drying, vacuum packaging, and the discovery and mass production of high-fructose corn syrup). Generous subsidies for corn and soy-based products, the primary ingredients of many energy-dense foods, have also contributed to the decrease. Regardless of the cause, as these calorie-dense foods become cheaper than more healthful alternatives, people shift their consumption toward more affordable, more fattening options (9).

In addition to falling monetary costs, technology has decreased the amount of time and energy it takes to prepare food. Decreasing nonmonetary costs are also expected to increase consumption. For example, the widespread availability and convenience of the microwave oven have made it even easier for prepackaged food, which tends to be higher in calories than food cooked from scratch, to play a more prominent role in the home. Today, 95% of US homes have a microwave oven, compared with 8% in 1978 (10). Decreases in the acquisition cost of food is also supported by the sheer volume of restaurants, cafeterias, snack bars, vending machines, and other locations where prepackaged foods can be purchased at low prices and with minimal preparation time. These options were not available a few decades ago.

So has food consumption increased consistently with falling food costs, both monetary and nonmonetary? In the United States, between the late 1970s and today, men increased their daily food intake by $\approx 80$ calories, and women increased their daily food intake by $\approx 360$ calories (11). On the assumption of no change in energy expenditure, these increases are more than enough to generate the rise in adult obesity rates and, consistent with these findings, women have experienced greater weight gain than men. Children have also increased their caloric intake. Adolescent boys now average $\approx 2800$ calories/d, an increase of 250 calories from the mid-1970s. Similarly, adolescent girls now average $\approx 1900$ calories, an increase of 120 calories (7).

Much of the increase in calorie consumption has occurred between meals, when the time costs were historically too high to prepare a high-calorie snack. As a consequence of innovations in technology and falling prices, the prevalence of snacking and the number of calories per snack have both increased. Jahns et al (12) showed that the prevalence of snackers among children of all ages increased from 77% to 91% from 1977 to 1996. Piersnas and Popkin (13) showed that sugar-sweetened beverages and desserts were among the highest contributors to snacking caloric intake in youth.

Energy expenditure

Although the cost of calorie consumption has decreased, the cost of expending those calories has increased significantly. Consider energy expenditure in the workplace. As a result of advances in workplace technology, even the most blue-collar occupations have been automated to the point where employees burn very few calories in the workplace. This technology has allowed employees to be increasingly productive and to earn a higher wage as a result, but partly at the expense of their growing waistlines. One study suggests that after 18 y, an average male worker would weigh 25 pounds more if he worked in the lowest fitness-demanding jobs than if he had worked in the highest fitness-demanding jobs (14). Yet not only are jobs that burn large numbers of calories increasingly hard to find, they also pay low wages, and few people would be willing to take a substantial pay-cut in exchange for a few extra pounds of weight loss.

One strategy to offset the increase in calories consumed and the decrease in calories expended in the workplace is to increase leisure-time physical activity. However, that too requires significant costs when one considers what needs to be given up to engage in that activity (what economists term opportunity costs). Over the past few decades, a host of sedentary new technologies, which include computers, the Internet, video games, cable television, and others, have been introduced that compete for our free time. It is estimated that children aged 8–18 y spend $>3$ h per day on average watching TV, DVDs, and movies and playing video games (15). To engage in physical activity requires taking a break from these and other technologies, which many people are not willing to do. As a result, leisure-time physical activity levels remain low. In the United States, only 4 out of 10 adults meet physical activity guidelines (16). The US Surgeon General reports that $\approx 25\%$ of US youth (aged 12–21 y) report no vigorous physical activity and $\approx 14\%$ of young people report no vigorous or light-to-moderate physical activity (16). Children also spend less time being physically active in school. In 2003 28% of adolescents participated in physical education courses, compared with 42% in 1991 (17).

Motivation to engage in health-seeking behaviors

There is at least one more potential cause behind the rise in obesity rates, or at least behind the lack of efforts among the obese to lose weight. And this, too, is based on economics. As a result of advances in medical technology, the health consequences of being obese have decreased. Over the past few decades, there has been a tremendous increase in medical, pharmacologic, and surgical treatments for the risk factors and diseases that obesity promotes, which suggests that the health consequences, one form of the cost of obesity, are not as great as they once were. For example, many drugs and surgical procedures have been introduced over the past 40 y that effectively treat cholesterol, blood pressure, and other risk factors that obesity promotes. Partly as a result of these new technologies, obese adults in the United States have better blood pressure and cholesterol concentrations than normal-weight individuals did a few decades ago (18). They are also likely to take newly developed medications to keep their diabetes under control. As a result of these and other medical advancements, they may be less concerned about their weight and therefore less likely to make an effort to decrease it.

One of the primary causes for the rapid introduction of new medical technologies is the fairly generous insurance coverage available in many countries. This coverage provides a level of assurance that these treatments will be financially viable and spurs research and development into new medical technologies.
In addition, through the decrease of the out-of-pocket costs of treatment, health insurance may also decrease an individual’s motivation to engage in obesity-prevention efforts. Ironically, health insurance, by directly lowering the out-of-pocket costs of treatments for obesity-related diseases, and by indirectly promoting new technologies that effectively treat these diseases, may have the perverse effect of decreasing the motivation for individuals to engage in obesity-prevention efforts.

**ECONOMIC FRAMEWORK**

Although medical technology has improved the treatment of obesity-related health consequences, the above discussion is not meant to suggest that obesity is not bad for one’s health. Obesity adversely affects nearly every system of the human body and greatly increases the risk of numerous adverse health conditions, especially diabetes. Data suggest that ≈70% of diabetes cases in the United States are caused by excess weight (19). Based on current trends, the World Health Organization expects that 366 million people will have diabetes by 2030 (20), and because of the increasing prevalence of childhood obesity, an increasing percentage of new cases will occur among youth (21). Obesity also greatly increases the risks of developing hypertension, high cholesterol, and heart disease. As a result of the increase in disease risk, obesity also decreases life expectancy, especially in those with BMIs >35. Evidence suggests that those who are ≈30 pounds overweight lose between 1 and 6 y of life, whereas those who are 100 pounds overweight lose up to 13 y (22). But diet and exercise have their own immediate costs, and many people may be willing to take their chances of arriving at these conditions later in life rather than engage in the increasingly costly behaviors required to maintain a lower weight.

Classical economic theory suggests that, given all possible choices, individuals will choose the options that make them best off (in economic terms, they make the choices that maximize their utility) given their preferences and constraints. These choices concern where they work, how much they eat and exercise, and whether they engage in activities to control excess weight, among others. The underlying assumption is that individuals have perfect information about these choices, but that they make the decisions that are best for them given the information they have. Moreover, the decision to acquire additional information, such as how many calories are in a meal, is also a choice that individuals can make if they perceive the benefits as worth the costs.

It is possible that food addictions, manipulation by marketers, short-sightedness, or other factors make it difficult for individuals to make optimal choices when it comes to their weight. However, it is also possible, and quite likely, that many rational, utility-maximizing individuals will engage in behaviors that are obesity promoting simply because—in today’s obesity-promoting environment—it is just too costly (in economic terms) to weigh less.

**THE ROLE OF GOVERNMENT**

From an economic perspective, the government’s role should be limited to the resolution of market failures. These failures occur when the private sector, left to its own devices, does not allocate resources efficiently. Common market failures include 1) externalities, 2) market power, 3) public goods, 4) asymmetric (imperfect) information, and 5) consumer irrationality. However, rising obesity rates are not, in and of themselves, evidence of market failure and in fact may be evidence of the success of the market in producing affordable and convenient foods and labor-saving goods and services that are increasingly demanded by consumers.

Externalities are the side effects of a market that influence the well-being of nonconsenting parties. Smoking is an example of a negative externality. It is the fact that smoking adversely affects the health of nonsmokers that provided an economic justification for governments to enact workplace smoking bans and other antismoking legislation. With respect to obesity, there is no clear externality, which suggests that government intervention is not warranted on these grounds.

Market power occurs when a single firm (monopoly) or a small number of firms (oligopoly) have a dominant share of the market. Microsoft, for example, has at times been the target of state and federal antitrust agencies because of concerns that its dominant share of the market for operating systems for personal computers allowed it to unduly influence this market. In general, antitrust agencies are concerned that firms will take advantage of this market power by raising prices. As noted above, food prices are falling, not rising. In fact, many communities are considering beverage legislation in efforts to increase prices and decrease consumption of the taxed products (23).

Public goods are those that would generally not be supplied by the private sector. The classic public good is an army, but parks and recreation areas, the food guide pyramid, and other public goods directly influence our food consumption and physical activity choices. Are too few public goods causing rising rates of obesity? Not likely. For example, the US government provides >84 million acres of public parks and recreation facilities, which is more than twice as many as there were in the in late 1970s, when obesity rates were markedly lower (24). Could the government do more? Of course, but it is difficult to argue that obesity rates have increased because of too few public goods. The change in relative prices is a more plausible explanation.

Asymmetric, or imperfect, information occurs when one person in a transaction has more or better information than the other party and that party cannot acquire information at a reasonable cost. However, whereas asymmetric information may lead to a failure of markets to properly allocate resources, this is not always the case. In fact, in most markets, buyers and sellers do not have the same information. With respect to food consumption, it is true that consumers know far less about the health and nutrition content of the foods they eat than do suppliers. Although people probably consume more calories, fat, and sugar as a result, the market does not appear to be suffering. For example, the lack of menu labeling in restaurants has not decreased the demand for these establishments. Over the past several decades, the amount of food expenditures going to full-service and fast-food restaurants has increased, not decreased (25). Although many jurisdictions have or are considering menu-labeling legislation for restaurants, most classical economists would argue that this legislation is unwarranted. If people truly want this information, they would go to restaurants that supplied it, such as Subway (Subway Corporate Office, Lawndale, CA) and suppliers, in response to this demand, would increasingly provide this
information or risk the loss of market share. So asymmetric information exists, but the extent to which this asymmetry requires government action is arguable.

Short of the above, one of the primary motivations often stated for obesity-prevention efforts is cost. It is true that the costs of obesity are rising rapidly and have now been estimated to be as high as $147 billion per year (5). Moreover, in the United States roughly one-half of the costs are paid by Medicare and Medicaid, which suggests that taxpayers foot the bill for much of the costs of obesity. However, if one is truly concerned about the high costs of obesity, then only cost-saving obesity interventions should be implemented. To date, there is no compelling evidence that obesity-prevention programs save money. This is not to say that there may not be a good reason to implement them, just that cost savings may not be it (note that many countries have made significant strides in the decrease of tobacco use even though there is evidence that smokers actually subsidize nonsmokers).

As an alternative approach, insurers could rate health insurance premiums so that those who weigh less or engage in healthy behaviors pay a lower premium. This is common practice for life insurance and in the individual health insurance market and it is increasingly being used by employers to incentivize healthy behaviors. If rates are set at appropriate levels, then the financial externality is decreased to zero and this ceases to be a valid motivation for obesity-prevention efforts from either the private or public sector.

So is there a role for government when it comes to addressing obesity? From an economic perspective, the best case for government intervention concerns obesity prevention among youth, who are clearly not utility maximizers. Children do not make rational decisions in most facets of their lives. That is why we force them to attend school and do not let them drink alcohol or smoke cigarettes, behaviors that are acceptable for adults. The rationale behind these policies is to protect youth from making decisions they might otherwise grow up to regret. The long-term health consequences of childhood obesity may be no less severe than for underage drinking and smoking. Therefore, as with these other behaviors, it is appropriate for the government to intervene in areas related to childhood obesity. Although one could argue that these same motivations apply to adults, adults have a greater understanding of the long-term costs and benefits of their actions. They also have a greater cognitive ability to make optimal choices (from an economic if not a health perspective) and have fewer constraints on their behavior than do youth. As a result, the justification to intervene with youth does not directly translate to adults.

In addition to making efforts to prevent childhood obesity, policy makers should revisit past policies to determine whether they may be doing more harm than good when it comes to obesity. In the United States, one example concerns generous subsidies for corn and soy that lower prices below market levels for products with these ingredients. These subsidies promote excess use of these products by producers and excess consumption by consumers above what would occur in a truly competitive market. As a result they may be partly responsible for the rise in obesity rates. Other examples that may inadvertently promote obesity include zoning and other transportation rules that promote automobile use at the expense of walking and cycling, and even the subsidy for employers to offer health insurance that limits other insurance models that may have a greater focus on prevention. These are just a few examples, but there are many others.

Given our contention that obesity results from market forces and technologic advances that lower the costs of behaviors that promote obesity, successful efforts to prevent obesity will need to do just the opposite: make it easier and cheaper to engage in a healthy diet and regular physical activity. This will require policy and environmental changes that extend beyond that which can be achieved through changes in health care financing and delivery. It will not be an easy feat, but anything short of that is unlikely to have a significant effect on the worldwide obesity epidemic.

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REFERENCES


