Obesity: Causes, Consequences and Public Policy Solutions

Obesity is a health issue that has more implications on policy than you might expect.

Obesity:
Causes, Consequences and Public Policy Solutions

By Robert Kaestner

(Editor's Note: Previous editions of The Illinois Report *have focused on the broad scope of the health care issue in Illinois. But within the challenges of providing a program that benefits all those in the state who need assistance lie policy issues specific to areas of health that often do not figure into the larger debate. This is one of those issues.)*

Obesity is one of the most pressing public health challenges facing Illinois and the nation. Nationally, the prevalence of obesity among children and adults has increased significantly over the last 30 years.[1] Among adults, obesity has increased nearly 150 percent, from 14 percent of the population in 1971-75 to 34 percent of the population in 2005-2006. Even larger relative increases have been observed for children; the prevalence of obesity among children has grown by 300 percent, from 5 percent in 1971-1975 to 16 percent in 2003-2006. And the United States is not alone. Many developed countries have witnessed an increase in obesity over the past 20 to 30 years.

Rates of obesity in Illinois mirror those in the country, as shown in Figures 1 through 4.

In 2007, approximately 27 percent of women age 18 to 64 and 29 percent of similarly aged men in Illinois and the U.S. were obese.[2] Also evident from Figures 3

Figure 1
Prevalence of Obesity Among Women in US and Illinois

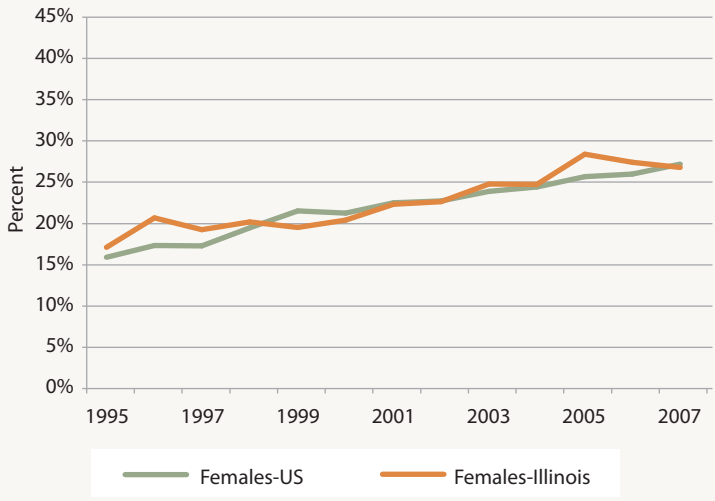
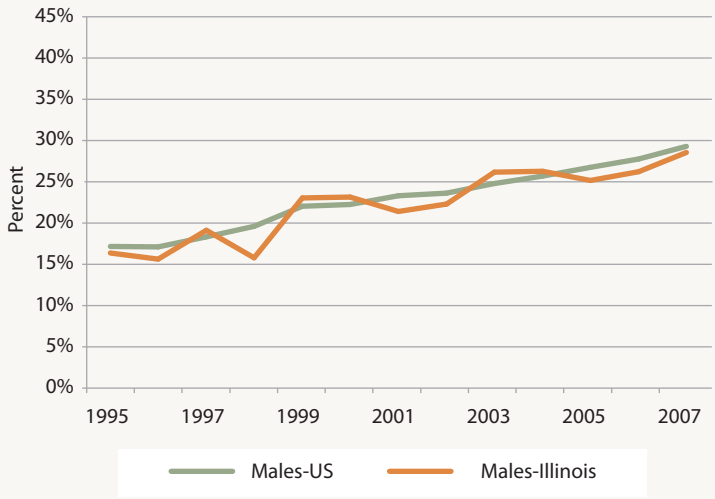


Figure 2
Prevalence of Obesity Among Men in US and Illinois



[1] The medical community uses the Body Mass Index (BMI), defined as a person's weight (in kilograms) divided by the square of the person's height (in meters), to classify individuals as obese whose BMI equals or exceeds 30 kg / m^2. The BMI can also be calculated as [Weight in Pounds/(Height in inches)^2 x 703.]

[2] Figures differ from those cited above because they were calculated using different data sources, different ages, and are based on self-reported weight and height. The trends in obesity reflected here are consistent with those reported other data sources.

Figure 3
Prevalence of Obesity Among Black and White Women in US and in Illinois

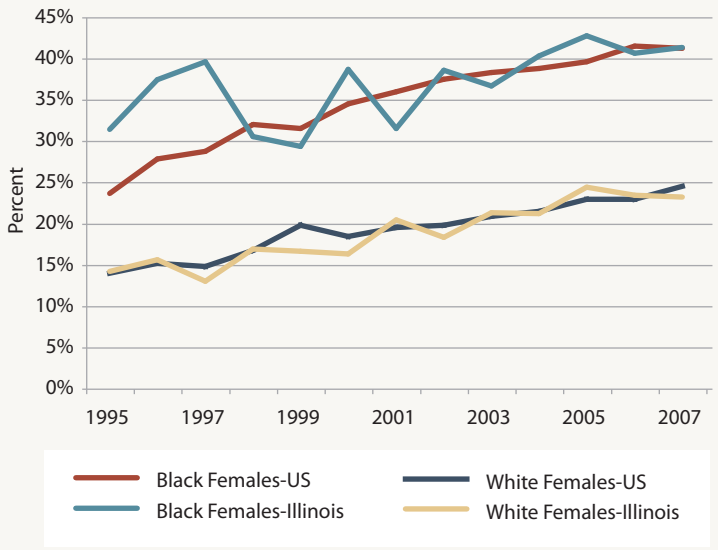
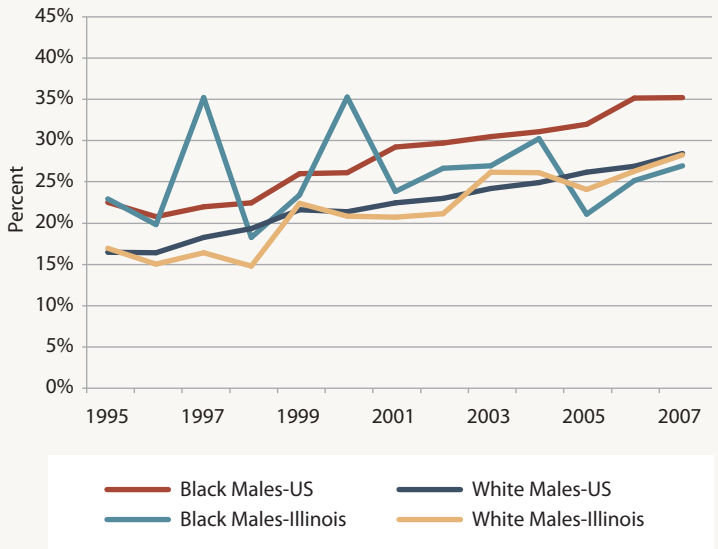


Figure 4
Prevalence of Obesity Among Black and White Men in US and in Illinois



and 4 are the substantially higher rates of obesity among black persons as compared to white persons in both Illinois and the nation (figures for Hispanics and other racial/ethnic groups are too variable due to small sample sizes).

The highest rates of obesity are observed among black women – more than 40 percent of black women were obese in 2007. While the level of obesity differs by demographic group, obesity has grown for all at about the same rate, which suggests that causes of the growth in obesity are common to all. For example, while there are substantial income differences between black and white persons, obesity has been growing about the same for both – higher income does not seem to protect against obesity.

The rise in obesity has generated a great deal of public concern primarily because obesity is associated with several serious health conditions including type 2 diabetes mellitus, heart disease, high blood pressure, hyperlipidemia, stroke, increased incidence of certain forms of cancer, respiratory complications, osteoarthritis, and increased mortality. Further, obese individuals have increased morbidity and reduced quality of life compared to non-obese individuals. Overall, obesity has been reported to be the second leading cause of premature death from a modifiable behavior with an estimated 365,000 deaths in the year 2000 attributed to obesity. Obesity may also affect well-being in other ways than health. Researchers have suggested that obesity may be a cause of lower educational achievement and lower earnings, for example, because of discrimination against obese persons.

The health care costs associated with being overweight and obese have been estimated at $78.5 billion in 1998. Approximately half of this sum ($37.6 billion) was paid for by the public through Medicare

Among adults, obesity has increased nearly 150 percent, from 14 percent of the population in 1971-75 to 34 percent of the population in 2005-2006.

and Medicaid. For Illinois, estimates of the health care costs of obesity were estimated to be $3.4 billion in 1999 with approximately one-third of this borne by the Medicaid program. These figures ignore the continued growth in obesity since 1998. Recent estimates suggest that approximately 30 percent of the rise in health care costs over the last 20 years is because of the rise in obesity. Reducing obesity to the level that prevailed 20 years ago (1987) would save the U.S. approximately $200 billion.

Causes of the Problem

Obesity is caused by an imbalance between calories consumed and calories expended; weight is gained when calories consumed (i.e., energy intake) exceeds calories expended (i.e., energy expenditure). Energy intake and energy expenditure are determined by many factors that can be broadly grouped into those that are specific to the individual such as biological (e.g., metabolism and genetics) and behavioral (e.g., physical activity), and those that are external, including environmental factors (e.g., food prices). Explanations of the rapid increase in obesity need to correspond to plausible changes in energy balance and, given the relative short time interval over which that growth has occurred, most observers rule out genetic changes. Similarly, while biological factors (e.g., metabolism) may partly explain the rise in obesity, most agree that it is growing primarily because of behavioral and environmental changes. In short, Americans are eating more and exercising less. But the reasons for the growth of this energy imbalance, the timing of its growth (post-1980), and why growth has been more severe in some places and for some populations than others remain in dispute.

Causes of Increased Energy Intake

Evidence shows that there has been a significant increase in calorie consumption over the last 30 years. Such an increase would not necessarily result in an increase in obesity unless combined with no change, or a decline, in energy used. This appears to have been the case, as evidenced by rising rates of obesity during the past 30 years.

The primary reason for the increase in calorie consumption is the declining price of food, particularly the price of high-calorie foods such as those containing high-fructose corn sweeteners and oils. While food prices have been declining throughout the 20th century because of increased efficiency in the agricultural sector, the price of calorie-dense foods and beverages has decreased markedly since the 1980s while the price of fruits and vegetables has increased. Related to this issue is the change in the price of food preparation – measured as the value of the time it takes to prepare a meal at home rather than buying a ready-made meal. As women have entered the work force, which occurred most during the period from 1960 to 1980, the price of home-prepared foods has increased along with the opportunity cost of women's time. Simultaneously, technological changes have lowered the price of fast foods and store-bought prepared foods that substitute for home-prepared meals. As a result, there has been a steady increase in meals eaten away from home, which differ in composition (types and size of portion) and number of calories than foods prepared at home. A final cause of lower food prices is urban sprawl, which is associated with supermarket expansion. Supermarkets take advantage of relatively cheaper land prices in the suburbs to exploit economies of scale that lower costs of distribution with the result being lower food prices in suburban areas. In addition, "big box" stores are not within walking distance of most residential neighborhoods. The shift of population to less dense areas also forces older, urban stores to close and when grocery stores are sparse, fast-food restaurants fill in the

Currently, 25 percent of the U.S. population is completely sedentary and 60 percent does not exercise sufficiently to meet recommended levels.

void. The greater availability of fast food relative to supermarket-purchased foods lowers the price of fast foods in these communities.

Causes of Reduced Energy Expenditure

Evidence on changes in energy expenditure (e.g., exercise, walking, physical labor, active leisure activities) is less available than for energy intake, but what evidence there is suggests that there has been a substantial decline. The percentage of persons working in physically demanding jobs remained steady between 1950 and 1970, but decreased markedly over the next 30 years. Similarly, more people drive and fewer people walk. In 1960, only 67 percent of travel to work was by automobile, but by 2000 that figure had risen to 88 percent. Much of the change in commuting comes from change in where people live. As urban sprawl has gradually increased, automobile travel has increased. Finally, there has been a change in recreational activities. Television viewing has increased by approximately 30 minutes per day every 10 years since 1950. While decreases in energy expenditure alone cannot explain rising obesity, when it is combined with increasing calorie consumption the results could be significant, as evidenced by the growing rates of obesity.

Technological change is the likely cause of these changes in energy expenditure. Innovation has made work, travel, and leisure activity less strenuous. Most notably, technological change has increased productivity in manufacturing and agriculture and significantly reduced the number of physically demanding jobs in the economy. Technology also has increased the value and reduced the price of sedentary recreational activities such as watching television and playing computer games. Technology has increased the variety and sophistication of these leisure activities, while at the same time improvements in manufacturing productivity has led to a drastic reduction in the cost of televisions, computers, and goods used with these activities (e.g., software, cable programming). In contrast, technological change may lower the cost of a tennis racquet, but the change in the price of engaging in tennis has probably increased more over time than the price of television viewing because the time costs are the same in each activity, but the costs of complementary goods have decreased more for television (e.g., expansion of cable TV) than tennis. In general, the costs of time-intensive activities like exercise have risen because of rising wages and increased participation of women in the work force. Therefore, relatively time-intensive recreational activities have declined.

Another factor affecting energy expenditure is urban sprawl. The interstate highway system and the rise in incomes have made suburban living more affordable (lower travel costs) and desired (desire for larger houses on cheaper land) and has caused more persons to live in areas that require more travel, leaving less time for exercise. A recent study reported that approximately 12 percent of the increase in obesity between 1970 and 2000 can be explained by suburbanization.

Overall, physical activity levels are relatively low and, while hard to measure, exercise has likely declined due to changes in the nature of work, travel, and leisure time activities. Currently, 25 percent of the U.S. population is completely sedentary and 60 percent does not exercise sufficiently to meet recommended levels.

Public Policy Solutions

Obesity is a growing and costly problem and many experts say rising costs of medical care justify government intervention. However, the obesity-related cost of health care is not necessarily the best argument for government intervention. First, some recent studies have shown that obesity, as

currently measured by body mass index above 30, is not as strongly correlated with morbidity and mortality as many have assumed. If correct, this fact would suggest that many estimates of the health care costs of obesity are exaggerated. Second, some argue that obese persons pay more for health care – through lower wages on jobs that provide health insurance – than less-obese persons. If so, then obese persons are paying their fair share, at least in the employer-sponsored market that insures most non-elderly persons in the United States. Third, while the medical costs may be large there are other fiscal consequences of obesity that are largely ignored and that may offset the higher medical spending associated with obesity. For example, if obesity does result in early death, social security spending would be significantly reduced. The upshot is that medical costs alone may not be sufficient to warrant government intervention.

A more persuasive argument for government intervention is that government has undoubtedly caused a significant part of the obesity problem through policies that affect the price of food (e.g., farm subsidies), the built environment (e.g., highway construction subsidies and zoning laws), and physical activity (e.g., school physical education programs). Modifying or eliminating these myriad programs is not feasible and may not be warranted by program effects on obesity, and so direct action on obesity is justified.

The problem that policymakers face is figuring out how best to intervene to reduce obesity. On this issue, there are many more proposals than good policies. Also, there is a distinct naiveté that ignores personal responsibility and the rational tradeoff that people make between health and consumption. There are many examples of people trading off consumption for health: working in risky jobs (e.g., law enforcement) for higher pay, buying home health and safety equipment to prevent accidental injury or death, and paying for more screening exams to detect illness. Obesity may largely be a result of a similar tradeoff – eating more and consuming more sedentary leisure activities, which are sources of great satisfaction, for a less healthy and somewhat shorter life.

No force is compelling people to eat fast food. People clearly enjoy McDonald's and decide freely to eat at McDonald's restaurants. The fact that more people work longer hours and family meals at home are more infrequent, generally, does not imply that eating at McDonald's is not a choice. Moreover, the fact that there are more fast-food restaurants today than 20 or 30 years ago likely reflects the fact that home-prepared food is more costly now than in the past because of demands outside the home. Given the voluntary nature of the activity, two incomes almost certainly provide greater benefits than one. Therefore, limiting such consumption would substantially reduce consumer welfare and be met with (appropriate) consumer resistance. Policies need to consider this basic fact.

Consider another example. While government subsidies to corn growers may have lowered the price of high-fructose corn syrup and lowered the price of soft drinks, most of the decline in the price of soft drinks comes from technological change (in production and distribution). Therefore, most of the increase in soft-drink consumption is not due to government intervention. Moreover, every adult knows that soft drinks are high in calories, but consumption among adults and their children continues unabated. These examples illustrate the point that much of obesity is voluntary, and government intervention to reduce obesity may face significant consumer resistance.

Taxes

Given that the government has implemented programs that have lowered the

price of energy intake and raised the price of energy expenditure, it is reasonable for the government to use tax policy to address these price distortions. Externalities associated with financing Medicaid and Medicare may also justify government intervention. However, taxing food is regressive and hurts low-income consumers the most. Moreover, it is very difficult to design a targeted tax, say at "junk food," that will be effective. Is Chinese take-out "fast food" or "junk food"? Is pizza "junk food"? If we tax food purchases at some types of establishments more heavily, consumers will switch to other types of establishments that are less costly – for example, buying prepared foods at supermarkets. Any tax of this type will be messy (arbitrary inclusion and exclusion of foods and establishments) and potentially ineffective, as the possibilities for consumers to find substitutes that are equally convenient and equally "unhealthy" are numerous. This conclusion stems from the basic fact that consumers are making optimal and voluntary choices and are rationally trading off convenience and weight gain for time.

Another popular proposal is to tax soft drinks, or to tax soft drinks at rates higher than other food items. Many states do this now to varying degrees. What effect will this have on obesity? It will likely decrease consumption of soft drinks (perhaps even diet soft drinks), but it will do so for both obese and non-obese persons – the latter group will be clearly made worse off by such a policy. Note that only 30 to 35 percent of the adult population is obese and a much larger fraction than this consume soft drinks. Next, a soft-drink tax will increase consumption of other drinks including high-calorie fruit juice and whole milk. A cup of orange juice has 112 calories; a cup of whole milk has 160 calories; and a cup of Coke – only 105 calories. Finally, soft drinks account for only 7 percent of calories consumed. Therefore, taxing soft drinks is unlikely to have any noticeable effect on obesity.

Taxes on food are focused on increasing the cost of energy intake, but taxes also can be used to lower the price of energy expenditure. However, designing such taxes may be difficult, costly, and largely ineffective. For example, how could tax policy be used to spur physical activity? The government could raise taxes on recreational activities that are sedentary, such as television viewing (televisions, cable subscriptions, etc.) or computer games. However, such taxes would harm many consumers who use these items and who are not obese, and harm consumers who use these products (e.g., computers) for other purposes (e.g., school and work). And raising the price of one class of products would create an incentive for the market to develop substitute products that are not taxed. Here is yet another example of the unintended consequences of government intervention into a market where transactions are largely voluntary. Consumers love television and computer games. Making these activities more costly does nothing to change this fact. Undoubtedly, there are many substitute technologies that could be developed that would thwart the tax code and serve consumer demand.

Subsidies (tax cuts) for activities that increase energy expenditures may be more effective at changing behavior, but these will be very costly. For example, providing a tax break for gym membership will be costly because much of the break will go to persons who already purchase gym memberships. Few people will be encouraged to join gyms (and use them) by providing a tax credit because much of the cost of the gym is a time and psychological cost.

In sum, tax policy has little likelihood of being used to significantly reduce obesity. Public health advocates who call for taxes on soft drinks and fast foods ignore the voluntary nature of obesity and exaggerate the potential effectiveness of these taxes to reduce obesity. Taxes on food are also regressive hurting the poor the most.

Those with more education have better health and better health behaviors that those with less education.

Direct Regulation

Direct regulation of the production and distribution of food is another policy approach that is growing, as bans on trans-fat in food production, selling fois gras, and having vending machines in schools attest. The problem with these approaches is that there are many substitutes for the banned products. Take vending machines in schools, which are most pertinent to middle- and high-school students. Products obtained from vending machines can easily be found in nearby stores and can be purchased before or after school to be consumed during the day. However, the whole idea that vending machines in school contribute significantly to obesity is laid bare when one considers that obesity rates among adults and children who buy nothing in school vending machines are growing as much or more than obesity rates of children who use vending machine products.

Some have argued that a ban on food advertising may be relatively effective at reducing obesity. The food industry spends considerable sums and represents a large portion of all advertising. A significant portion (approximately 10 percent) of it is geared toward calorie-dense foods. Advertising has been shown to be effective at getting consumers to switch brands and may be an explanation for part of the increase in consumption of calorie-dense foods, which are widely advertised. Banning such advertising may help lower consumption of such products.

School-Based Physical Activity

Research has shown that school-based physical activity can help reduce obesity and improve weight control. Unfortunately over the last 20 years, physical activity at school has declined. Perhaps the best evidence comes from studies of the effect of Title IX on adolescent and adult obesity. Title IX of the Education Amendments of 1972 mandated equal opportunity to participate in sports for girls and boys and resulted in a dramatic increase in girls' school sports participation in the 1970s. This increase in exercise resulted in a significant decline in girls' obesity during the 1970s and follow-up studies have found that these improvements in weight during adolescence lasted into adulthood. Notably, Illinois mandates daily physical activity in grades K-12, and is in the forefront of states on this issue.

General Education

A positive association between education (e.g., years of completed schooling) and health has been widely documented. Those with more education have better health and better health behaviors that those with less education. More importantly, the relationship between education and health remains after adjusting for income, health insurance, and many other factors that are correlated with education. So it is not the case that education is simply a proxy for some unmeasured determinant of health. Instead, it is widely agreed that education is a cause of good health.

The positive association between education and health is also found in the specific cases of diet, exercise, and obesity. For example, a recent study of adults in the U.S. showed that every additional year of education reduced the probability of being obese by one to two percentage points or between 3 and 7 percent. These results imply that a college graduate is 12 to 28 percent less likely to be obese than a similar person with just a high school degree. Similarly, education was positively associated with exercise. Each year of education raised the likelihood of engaging in vigorous exercise by 5 to 10 percent, and someone with a college degree was 20 to 40 percent more likely to exercise vigorously than someone with a high school diploma.

The positive relationship between education and health implies that good education

The best hope to slow and possibly reverse the trend in obesity is to improve the quality of education, particularly in childhood.

policy is also good health policy. Education is a powerful determinant of health, and many other social and economic outcomes. Unfortunately, high school graduation rates in many large cities, including Chicago, are around 50 percent. Increasing rates of high school graduation and the quality of schools will likely lead to significant improvements in obesity and population health more generally.

Summary

The causes of obesity are simple: too many calories consumed and too few calories expended. Over the past 30 years, obesity has increased because technological change has lowered the price of calorie-dense foods and sedentary activities and raised the price of low-calorie (non-calorie dense) food and physically challenging activities. In addition, increased women's labor force participation and increased suburbanization have changed how families eat, get to work and shop, and have contributed to the rise in obesity.

Solutions to obesity that attempt to reverse these fundamental and largely voluntary changes in society are unwise and are modern analogs to Luddism. The ship has sailed on women's entry into the labor force, urban sprawl, computer games and fast food. Only draconian polices that consumers will likely find completely unacceptable would have a chance of significantly affecting obesity. The best hope to slow and possibly reverse the trend in obesity is to improve the quality of education, particularly in childhood. Recent research has demonstrated that children's cognitive ability is directly associated with adult health and well being; children who have higher cognitive ability are less likely to be obese as adults and are more likely to be healthy. Evidence strongly suggests that it is general education (i.e., cognitive ability) that matters for health—not specific information about the costs and benefits of healthy lifestyles. In addition, there is growing evidence that non-cognitive ability such as the ability to delay gratification are also quite important to health and that these abilities are formed early in life. So, early childhood programs that raise cognitive and non-cognitive abilities may be particularly valuable in the fight against obesity.

Robert Kaestner is a professor of economics at the University of Illinois at Chicago and a faculty member of the Institute of Government and Public Affairs. He is interested in the effectiveness of health insurance and how welfare reform affects the health of low-income families. Professor Kaestner is also a Research Associate for the National Bureau of Economic Research. He has studied the effects of Title IX on health and health behavior of girls and women. He also has studied the effect of sports participation on obesity.