

More Calories and Less Exercise . . .

Eleanor Schlenker, James Pease, Karen Mundy

"Add medium fries and 21-ounce drink for only \$1.41 more!" The sign in the fast food restaurant does not tell us that by buying the extra value meal we will add over 600 calories¹ to our lunch. At another fast food restaurant, we can go from a classic double with cheese at 760 calories to an old fashioned combo meal and add an additional 600 calories for only \$1.57 (Prevention Institute). Based on two of such "deal meal" lunches a week, we could add nearly 9 pounds a year to our body weight.

The food landscape has changed drastically over the past 100 years, as the U.S. moved from an agrarian economy in which people raised their own food or purchased what they did not raise from a neighbor to an economy that features supermarkets offering over 40,000 food items from around the world. Americans spend about 10 percent of their income for food, less than people in any other country in the world (USDA). Our abundant supply of food at low prices, relative to other countries, has both positive and negative implications for health. Nutrient deficiency diseases such as pellagra that were common in the South in the early 1930's have been eradicated. At the same time, the incidence of obesity has increased steadily over the past three decades (Pi-Sunyer and Kris -Etherton).

The latest data from the National Center for Health Statistics show that 30 percent of U.S. adults 20 years of age and older - over 60 million people - are obese. This increase is not limited to adults. The percentage of young people who are overweight has more than tripled since 1980. Among children and teens aged 6-19 years, 16 percent (over 9 million young people) are considered overweight (CDC).

Overweight and Obesity: Defining and Measuring

The definition of overweight was first formulated in the late 1890's when the Metropolitan Life Insurance Company

¹ We commonly used the term "calorie." The unit is kilocalorie (kcal) or the amount of heat required to raise 1 kg of water 1° C.

began to keep records on the body weights and heights of their new policyholders. The company developed actuarial tables to predict the life span of individuals of specified height and weight. The tables did not represent the general population because few women and minorities held life insurance policies at that time. The insurance actuarial tables also did not distinguish between body weight and body fat. A football player may exceed the recommended body weight for a person of the same height but is likely to have more muscle and less fat than the average person. By the current definition, the football player may not be overweight.

Today we define overweight and obesity using a measure called the Body Mass Index (BMI). The BMI standards classify individuals from underweight to obese. The BMI is calculated using height and weight (Box 1), taking into consideration the relationships between body muscle and body fat. Obesity is defined as an excessive amount of body fat in comparison to the amount of muscle and other body components. Risk of diseases such as diabetes mellitus, heart disease, hypertension, and osteoarthritis, are all increased in

Box 1. Calculating your BMI

BMI = body weight (kg) divided by body height (m)²

Using pounds and inches:

1. Multiply your body weight in pounds by 705
2. Divide result from step 1 by your height in inches
3. Divide result from step 2 by your height in inches (because your height is squared)

Your BMI is _____

Eleanor Schlenker is Professor, Human Nutrition, Food, and Health. James Pease is Professor and Karen Mundy is Communications Specialist, Department of Agricultural Economics.

people who, according to the BMI, are obese (Bray and Champagne). Chronic disease risk begins to rise at a BMI of 25 and accelerates sharply at levels of 30 and over (Box 2).

Box 2. Standards for Body Mass Index (BMI)

| BMI | Weight category |
|---------------|-----------------|
| 18.5 – 24.9 | Healthy weight |
| 25.0 – 29.9 | Overweight |
| 30.0 and over | Obese |

Causes of Increase in Obesity

The law of thermodynamics tell us that overweight and obesity result from an energy imbalance or an excess of calorie intake over energy expenditure. However, this law does not explain the effects of the food environment, family income, lifestyle, individual characteristics that interact to cause weight gain.

Food environment

Per capita food consumption has risen dramatically in recent years, increasing by almost 25 percent (716 calories per day) since the 1970's. This increase in itself could account for the so-called obesity epidemic (Loureiro). The U.S. food industry has become increasingly efficient and more competitive in the past three decades, producing greater quantities and varieties of food at lower real prices. The rise in food consumption was fueled by the marketing trend to "supersize," leading to ever-growing portion sizes and correspondingly more calories. The 2 to 3 ounce hamburger became the 5 to 6 ounce hamburger, and the 32 ounce supersize soft drink replaced the 6 ounce drink. (To compare calories of different size portions go to <http://hin.nhlbi.nih.gov/portion>.) These changes appeal to consumers' wishes to get more for their money: for a few cents more, they can double or triple their food purchase. This food bargain attitude is often disastrous for personal health.

The rapid proliferation of vending machines, coffee shops (with high calorie specialty drinks), and other sources of ready-to-eat foods satisfies our demand for quick-and-easy food. Supermarkets now have eat-in facilities, and most service stations on major highways offer a food market with a wide variety of snacks. Vending machines have been introduced into public schools and often compete with the school lunch program.

A striking change in food consumption over the past 30 years has been the rise in consumption of high fructose corn syrup (HFCS). HFCS is used to sweeten nearly all soft drinks and juice drinks sold in the U.S. The rapid growth in the use of soft drinks in recent years parallels the rise in both child and adult obesity (Bray and Champagne).

Another change in food consumption is that the proportion of fat in the diet has decreased by several percentage points even as calorie intake continues to rise

(Wright et al.). Over 35,000 low fat and fat free food products have been introduced since 1987 with the goal of lowering the incidence of cardiovascular disease (Kuchler and Golan); however, these products may have actually added to the obesity problem. Many consumers assumed that low- and nonfat items are also lower in calories and increase their portion size.

Family income

Family income and the relative amounts and types of food available to family members influence body weight. Refined carbohydrates like bread and pasta and foods with added sugar and fat are higher in calories but also cheaper than fruits and vegetables. Foods higher in energy density² have the advantage of making us "feel full." When families do not have sufficient food, feeling full becomes their first priority. Foods that are relatively high in calories and low in cost are the major energy sources in most food plans, including the USDA low cost food plans. For example, based on food prices in a major western city, cookies or potato chips provide 1,200 calories per dollar as compared to carrots at 250 calories per dollar. Soft drinks are more energy dense than orange juice at 875 calories versus 170 calories per dollar (Drewnowski and Specter). Fresh and frozen fruits and vegetables are also less likely to be available in food stores in low income areas. Low income people may become overweight because they cannot afford both a more balanced diet and feel satisfied, if not full.

Lifestyle

Calories expended in physical activity have continued to decline as activities have become more mechanized. Children spend their free time playing video games or surfing the Internet rather than playing outdoor games. The reduction in hours of physical education per week in both elementary and high school has altered patterns of physical activity. Only 29 percent of children participate in daily physical education programs (Am. Dietetic Assoc.). Community infrastructure changes have also fueled the obesity epidemic. Suburban neighborhoods with limited sidewalks and the need to cross busy highways to reach shopping or service areas are not conducive to walking or bicycling for recreation or family errands. People living in such areas walk less and are more likely to be overweight (Ewing et al.).

Individual characteristics

Scientists continue to find evidence that individuals with specific genetic characteristics are more likely to become obese, whereas others are more resistant to weight gain.

² Energy density measures the available dietary energy per unit of weight. Most energy dense foods are dry since water contributes nothing to the energy density. Dry-roasted peanuts, cookies, and candy are high in energy density while raw vegetables, because of their water content, are low.

Genetic factors control the production of hormones that influence hunger, satiety, and the addition of body fat. Fetal imprinting resulting from a mother's diet during pregnancy has been related to weight gain in both children and adults. To maintain a stable body weight over time, finely tuned metabolic systems correct for daily errors in energy balance, increasing energy intake or conserving energy stores when energy demand are high, and reversing these functions when calorie intake has been excessive. However, in some individuals this process does not operate as it should and body weight rises. Although the genetic pool has not changed appreciably over the past 100 years, the limits on available food and the intense physical activity required in daily life helped prevent the expression of obesity in the past (Bray and Champagne).

Cost of Overweight and Obesity

Overweight and obesity are costly health conditions. Health insurance typically does not cover the costs of surgery or dietary products for weight loss, even if the weight loss would reduce complications associated with conditions with medical conditions like diabetes and heart disease. The total cost of health care for overweight or obese adults in Virginia was estimated at \$1.64 billion from 1998 to 2000 for just 5.7 percent of the eligible population of overweight or obese individuals. For public health care programs, Medicare costs were estimated at \$320 million and Medicaid costs were estimated at \$374 million for 6.7 and 13.1 percent, respectively, of the eligible overweight or obese population (Finkelstein, Fiebelkorn, and Wang).

Solutions for Overweight And Obesity

Coalitions of volunteer community agencies, health care agencies, and government units need to put in place preventive strategies and treatment interventions.

Education

Both children and adults require nutrition and health education that is easy to understand and put into practice. School health programs and physical education classes promoting the development of positive lifestyle habits need to have more resources in schools. Media outreach or educational programs at local health care facilities, work sites, or senior citizen centers could reach adults of all ages.

Regulation

Under the National Labeling and Education Act of 1994, nutrition information must appear on the packages of all processed foods. Unfortunately, the nutrition label can be difficult to interpret, particularly in terms of serving size. Consumers may not realize that a small package may contain more than one portion; consequently, they take in many more calories than expected. Also, serving sizes are not always consistent from item to item, or in agreement with those appearing on the new Food Guide Pyramid from USDA. This

lack of consistency leads to confusion for those trying to control calorie intake. Nutrition educators have suggested that restaurants, food vendors, employee cafeterias, and school nutrition programs post the nutritional content of their food (Bray and Champagne). Some fast food outlets and other food providers are making this information available, but many are not. Better nutrition labeling and use by consumers is essential for improved diets.

Preventive health care

Traditionally, U.S. health care has focused on treatment rather than prevention. When a condition is diagnosed, a practitioner seeks to cure or alleviate the problem. The new paradigm should be focused on prevention: helping individuals develop lifestyle patterns that will prevent or delay the development of obesity and the resulting chronic diseases. Appropriate food choices along with regular physical activity such as walking are the cornerstone of disease prevention. Unfortunately, many health care providers have limited background in both nutrition and exercise physiology, as these areas are only beginning to receive attention in most medical school curricula. Emphasis on preventive health will also require restructuring of the insurance payment system which is based on disease care rather than prevention and health promotion services.

The National Center for Chronic Disease Prevention and Health Promotion has provided \$300,000 to \$450,000 annually to states to develop nutrition and physical activity programs to prevent obesity and other chronic disease. For fiscal year 2005, 23 states are participating, but Virginia is not one of the participating states.

Food systems

Encouraging consumers to limit the amounts or types of food they consume will require major shifts by food companies and the advertising media. Consumer demand must drive any movement toward the production and marketing of healthier foods. As an example, the demand for bottled water, which now outsells soft drinks as the cold beverage of choice, was fueled by aggressive messages about the need for hydration, especially when engaging in physical activity. On the other hand, some groups have called for regulations that limit advertising of high sugar items to children, as is now the case with tobacco products.

Conclusion

With obesity and its associated diseases reaching epidemic proportions, we need to take steps to reverse the trends. We must not attempt to legislate what people eat, but we can provide education and we can make healthier foods less costly, and thus more readily available, to low income families. Without intervention, health care costs from diseases associated with overweight and obesity will soar.

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Virginia Polytechnic Institute
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