

NUTRITION

Calorie (Energy) Balance

Overweight and obesity result from an imbalance that occurs when the calories consumed exceeds the calories expended. Even small imbalances over time can result in weight changes. For example, a difference of one 12-oz soda (approximately 150 calories) or 30 minutes of brisk walking most days can add or subtract approximately 10 pounds of body weight per year.

There are many physiological factors (e.g., gut hormones) that operate to maintain body weight at a constant level even though calorie intake often varies considerably from day to day and week to week.⁽²⁾ The physiological factors regulating food intake tend to be more effective in defending against weight loss than against weight gain. This is thought to be an adaptive mechanism that protected humans from the adverse effects of famine and starvation. However, the physiological factors that tend to maintain calorie balance can be overwhelmed by environmental and behavioral factors that favor high calorie consumption or low physical activity.

When weight gain occurs, a person's energy balance thermostat is reset to achieve calorie balance at the new, higher level of body weight. Thus once weight gain occurs, a new calorie balance level is established. The body then tends to defend against weight loss from this new, larger weight status.

Although the tendency for overweight and obesity is a product of complex interactions between physiological, genetic, environmental, and behavioral factors, the rapid increase in rates of overweight and obesity in the United States over the last several decades has occurred too rapidly for changes in genetic or physiological mechanisms to be solely the cause. Therefore, the emerging obesity epidemic is almost certainly due to changes in consumer food choices and physical activity levels resulting in an overall positive calorie balance and weight gain.

Total calorie intake refers to all energy consumed as food and drink. Proteins, carbohydrates, fat, and alcohol provide 4, 4, 9, and 7 calories per gram, respectively. Some calories (e.g., approximately 1.5 calories per gram) are obtained from dietary fiber that undergoes bacterial degradation in the large intestine to produce volatile fatty acids, which are then absorbed and used as energy in the body. Physical activity such as walking 2 miles in 30 minutes burns approximately 150 calories. Because of limited capacity to convert excess calories to protein or carbohydrate, the body stores excess calories as body fat, regardless of whether the excess calories are caused by inadequate physical activity or excessive intakes of calories from any of the nutrient sources of calories. Reductions in large body fat reserves, which have often accumulated gradually over long periods of time, and subsequent maintenance of healthy body weight, will likely require long-term commitments to changes in eating and physical activity.

(1) The term "energy balance" is commonly used to describe the relationship between the number of calories consumed from foods and the calories used by the body. For purposes of this document, however, the term "calorie balance" is used in place of "energy balance" since calories are the unit of energy measurement used for nutrition labeling and best understood by consumers. Therefore, in this document, the terms "energy balance" and "caloric balance" are used interchangeably.

(2) Among the factors affecting body weight are body size and fat-free mass (i.e., the weight of the body less the weight of its fat mass) and also to a lesser degree age, gender, body composition, nutritional status, inherited variations, and/or differences in the hormonal status. Physical activity is the most variable of the calorie expenditures among individuals.

For some individuals, physical activity is only a small proportion of the total calorie requirements; for very active individuals, it can be a significant proportion of daily calorie needs. Body weight is a major determinant of the calorie expenditure from physical activity. For example, the calorie cost of walking a mile at a moderate pace is 69 calories for a 140 pound individual and 58 calories for a person weighing 114 pounds. The intensity of physical activity can also affect calorie expenditure. For example, more calories are expended when jogging than when walking for the same amount of time.

Source: U.S. Food and Drug Administration