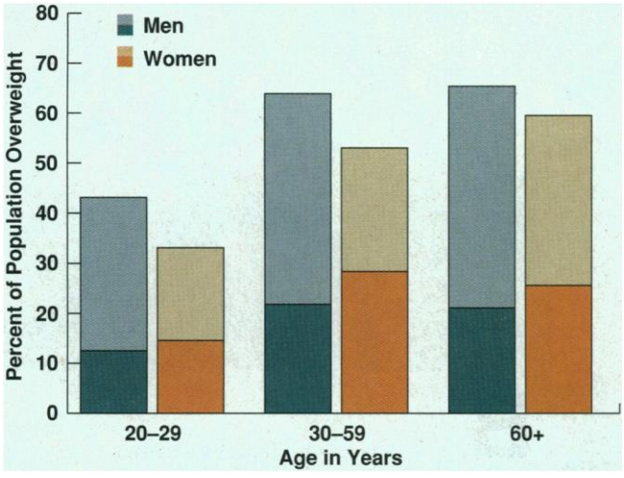
Obesity: How Big a Problem?

With obesity rates soaring, experts debate whether everyone who is overweight needs to lose the excess pounds to preserve his or her health

Today, practically everyone is concerned about his or her weight—and seemingly with good reason, as it's clear that people have been getting fatter (see p. 1367). By the most stringent definition, more than half of U.S. women and men age 20 and older are now considered overweight and nearly one-quarter are clinically obese. What's more, many studies have linked being overweight to increased risk for heart disease, diabetes, and cancer, leading the World Health Organization and officials such as the former U.S. Surgeon General C. Everett Koop to declare an epidemic of obesity in the United States and around the globe.

They claim that heavy people are not only harming themselves, but are also emptying everyone's pockets. In the United States, the Institute of Medicine says, fat people are costing citizens more than $70 billion annually in both direct health care costs and indirect ones such as lost productivity. "We can't become complacent about this epidemic of obesity, which seems to be worsening over time," says JoAnn Manson, an endocrinologist at Brigham and Women's Hospital in Boston.



SOURCE: NATIONAL CENTER FOR HEALTH STATISTICS

Too much population growth? Including the so-called "preobese" (BMIs between 25.0 and 29.9), more than half the U.S. population above 20 years of age is overweight, and nearly a quarter is clinically obese (dark shading).

But recently many obesity experts have come to believe that these alarms are overstated, and that many people, particularly those who are only moderately overweight and otherwise healthy, shouldn't worry about shedding their excess pounds. They point out that many of these studies don't account for confounding factors associated with obesity, such as a sedentary lifestyle. Thus, the evidence may not, in fact, warn against body fat per se but rather against lack of physical activity.

These experts add that even if being overweight is risky, there is scant proof that weight loss leads to a longer life in healthy overweight people. Given that few people can lose weight and keep it off, they question the wisdom of this approach. "Americans spend about $40 billion per year on weight-loss treatments, mostly in the form of diets and dietary foods, and this approach is clearly not working," says Steven Blair, research director of The Cooper Institute for Aerobics Research in Dallas.

This revisionism has stirred plenty of controversy. Nutrition researcher John Foreyt of Baylor College of Medicine in Houston, for one, notes that "obesity is the driver" for health risks including high lipid levels, high blood pressure, and high blood sugar. But other doctors and scientists are advocating a more individual approach to weight loss: examining each person's risks, which depend not only on weight, but also on age, distribution of body fat, family history of disease, and current health problems such as high blood pressure. "It's very tricky how you decide whether an individual should be subjected to the rigors of weight reduction," says endocrinologist Rudolph Leibel at Columbia University College of Physicians and Surgeons in New York City.

Weighing the risk

The modern medical case against obesity began to build in 1959, with the publication of the Metropolitan Life Insurance Company tables. Based on studies of hundreds of thousands of policy holders, the tables said that the risk of premature death increases steadily as weight increases above the so-called "desirable weight," corresponding to about 126 pounds (57 kg) for a 5'4" (1.63 m) woman and 154 pounds (70 kg) for a 5'10" (1.78 m) man—remarkably lean standards that about 80% of American men and women now exceed.

Several studies since then have supported that view, including two reported in 1983. One of these, from Helen Hubert and her colleagues at the National Heart, Lung, and Blood Institute (NHLBI) in Bethesda, Maryland, and Framingham, Massachusetts, included 5209 men and women between 30 and 60 years old from the Framingham area who were initially weighed and examined in 1949. The researchers found that the degree by which these people exceeded their desirable weight predicted—independent of age, smoking, and other variables—their incidence of coronary disease and consequent deaths 26 years later.

In the same year, epidemiologist Robert Garrison and his NHLBI colleagues published data on the 2000-plus men in the Framingham Heart Study cohort showing that men who were just 20% above their desirable weight had significantly elevated mortality from all causes. "Slight overweight carries a risk for a lot of people," says Garrison, now at the University of Tennessee Health Sciences Center in Memphis, an idea, he adds, that "remains correct" today.

Garrison's view got a big boost in 1995, when Manson and her colleagues published two sets of results from the prospective Nurses' Health Study, a cohort of more than 115,000 young and middle-aged female nurses who had been followed for 14 to 16 years. The two reports related rates of death and cardiovascular disease to body mass index (BMI), defined as an individual's weight in kilograms divided by the square of his or her height in meters.

The researchers found the lowest mortality rate in women with BMIs of less than 19. Compared to these very skinny women—today the BMI of the average U.S. woman is about 26—the risk of death increased by 20% for BMIs from 19 to 24.9, 60% for BMIs of 27 to 28.9, and by more than 100% for BMIs of 29 and higher. Heart disease risk showed a similar trend. "Average weight is associated with a substantial increase in risk of heart disease," Manson concludes.

The most recent study showing that skinny is safe appeared in the 1 January issue of *The New England Journal of Medicine*. June Stevens at the University of North Carolina, Chapel Hill, and her colleagues followed a cohort of more than 62,000 men and 262,000 women

Do 'Apples' Fare Worse Than 'Pears'?

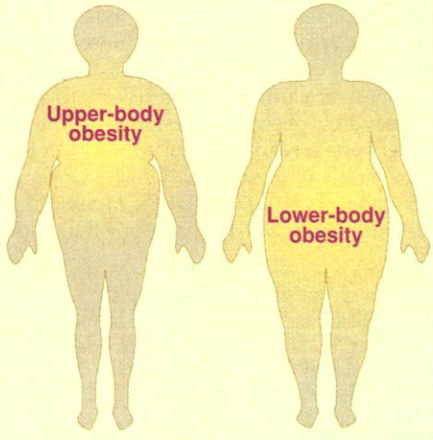
While some experts debate how risky it is to be overweight and just who should slim down (see main text), others insist that it's not just how much fat you have but where you carry it that affects your risk of disease. In their view, fat inside the abdomen, as opposed to flab on the thighs and buttocks, is the main culprit. "There's growing enthusiasm" for the idea that abdominal fat increases the risk of such serious conditions as diabetes and cardiovascular disease, says lipid researcher Ronald Krauss of Lawrence Berkeley National Laboratory in California.

The problem, these researchers say, is that abdominal fat cells quickly break down stored lipids and dump the resulting fatty acids into the bloodstream. That could in turn cause a dangerous rise in blood levels of the sugar glucose and triglyceride fats. But others argue that abdominal fat is secondary to the true problem, which leads to both disease and bulging bellies: excessive production of hormones that surge into the blood during stress.

Although a French physician named Jean Vague linked abdominal fat to disease in 1947, few obesity researchers took the idea seriously until 1982 when endocrinologist Ahmed Kissebah's group at the Medical College of Wisconsin in Milwaukee showed that women with abdominal obesity are less efficient at breaking down glucose—a defect that can augur type II diabetes—than are lean controls or heavy women with mostly lower-body fat. The researchers also found a clue as to why: Abdominal fat cells are much larger, and much more adept at breaking down lipids into fatty acids, than fat cells on the leg and buttocks. The Milwaukee group reasoned that the flood of fatty acids might interfere with glucose metabolism.

Since then, many researchers have confirmed and extended these results. They've shown that when free fatty acids from the blood bombard muscle cells, the cells have trouble taking up glucose. That raises blood-glucose levels and, thus, the risk for type II diabetes. In addition, fatty acids from belly fat have direct access—by way of the portal vein—to the liver, where they suppress the normal breakdown of insulin, the hormone that enables cells to absorb glucose. As a result, blood-insulin levels rise, making muscle, fat, and liver cells less sensitive to the hormone—a condition that could further augment blood-glucose levels.

The fatty acid overload also seems to coax the liver to churn out more triglyceride fats and dump them into the blood, where they can, in large amounts, promote atherosclerosis and increase the risk of heart attack. What's more, lots of free fatty acids might even raise blood pressure—perhaps by increasing the sensitivity of arteries to hormones like epinephrine that make them contract.



Outline of danger. People with mostly upper body fat (apples) may face more health risks than pear-shaped people.

But fatty acids, or even fat, might not be the primary culprit at all, says obesity researcher Per Björntorp of the University of Göteborg in Sweden. He proposes that the real cause of the ills that have been linked to abdominal obesity—as well as the belly fat itself—is stress hormones like cortisol.

Björntorp came to that conclusion after his team found, in studies of thousands of people, that individuals whose cortisol levels spike during the day because of chronic stress have significantly more abdominal fat than people whose daily cortisol rises and falls in the natural cycle. The researchers also think they know why: Abdominal fat cells are densely peppered with the receptors through which cortisol exerts its effects and that can, when stimulated, promote fat absorption.

What's more, because cortisol independently causes insulin resistance and can spur the production of heart-damaging lipids, the hormone alone could account for many of the ill effects attributed to excess abdominal fat. "I think fat in the belly is an index of the basic hormonal disturbance," Björntorp says. "The fat itself may or may not be a disease-generating factor."

Kissebah suggests another factor that might help explain the link between abdominal fat and disease. He notes that belly fat may be an indicator for genes that influence both where fat is deposited and disease risk. But he adds that however the abdominal cells get fat, the fatty acids they release might compound the problems created by stress or genes. "I think all three things are working together," Kissebah says. **–I.W.**

from the American Cancer Society's Cancer Prevention Study I for 12 years, and they found that the lowest death risk from any cause and from cardiovascular disease for women and men up to age 74 was associated with BMIs between 19 and 21.9.

The link between excess weight and an increased risk of death apparently does not hold for the elderly, however. Stevens and her colleagues found no increase in the death rate as BMIs increased, even to very high levels, for subjects 75 years old and up. And in the April *American Journal of Public Health*, statistician Paula Diehr of the University of Washington, Seattle, and her colleagues found no effect of increased body weight on the 5-year mortality of more than 4000 nonsmoking men and women who were 65 to 100 years old. "The link between BMI and mortality is weaker for older adults than for younger ones," Diehr says.

Moreover, not all studies show that being slightly overweight carries an increased risk of mortality in younger persons. Several indicate that the risk is very low over a wide distribution of weights and that the low point in that is closer to a BMI of 24 than 19. In the 15 April *American Journal of Epidemiology*, for example, statistician Ramon Durazo-Arvizu, epidemiologist Richard Cooper, and their colleagues from Loyola University Medical Center in Maywood, Illinois, reported 12-year follow-up data on 13,242 men and women who participated in the first National Health and Nutrition Examination Survey (NHANES I) Epidemiologic Follow-up Study.

They found that mortality was lowest at a BMI of 27.1 for black men, 28.8 for black women, 24.8 for white men, and 24.3 for white women—all very near the average BMIs for those groups. What's more, the authors determined that for BMIs spanning nine units around the safest value, mortality was no more than 20% higher. This range includes 70% of the population. "Others suggest that a BMI of less than 19 is optimal, and that's questionable," Durazo-Arvizu says.

Cooper and Durazo-Arvizu believe the

strength of their study rests on the fact that the results apply to the entire NHANES cohort, in contrast to those of other studies in which subgroups of smokers and people who were ill had been eliminated because those factors are thought to decrease weight while boosting the risk of death. Still, when the Loyola team weeded out smokers, they found that their results were very similar to those for the entire group.

Who should lose

One reason for these conflicting results, say experts, may be that measures of fatness alone leave out other factors that can affect just how much risk excess weight confers. These include the location of the additional fat, because many experts think that abdominal fat is more hazardous than lower body fat (see sidebar), and also an individual's fitness. Indeed, recent evidence indicates that being unfit confers an even greater risk of death than being overweight does.

In a study of 21,856 men of varying body sizes presented last May at the annual meeting of the American College of Sports Medicine in Denver, statistician Chong Lee at the University of Alabama, Birmingham, the Cooper Institute's Blair, and their colleagues found that unfit, lean men with BMIs of 25 or less had twice the risk of mortality from all causes than fit overweight men with BMIs of 27.8 or greater.

Because fatter people tend to have lower activity levels, their sedentary lifestyles may thus at least partly account for their increased risk of disease and death. "I am concerned that these studies [on obesity risk] may have been overemphasized, primarily because the great majority do not take physical activity or cardiorespiratory fitness into account," says Blair. Still, there's little doubt that serious overweight, as indicated by a BMI over 30, increases the risk of death—by anywhere from 50% to 150% depending on the study. But that raises another puzzle: So far epidemiologists have been unable to gather abundant evidence that losing weight extends life-span.

Researchers have had good reason to expect that it should. Back in the mid-1970s, nutritional biochemist George L. Blackburn and his colleagues at the New England Deaconess Hospital (now the Beth Israel Deaconess Medical Center) in Boston showed that loss of just 10% of body weight in about 200 people who were 50% to 100% overweight produced significant drops in their blood pressure, blood levels of heart-damaging lipids called triglycerides, and blood-sugar levels. Weight losses also increased levels of high density lipoproteins (HDLs), which are supposed to protect against cardiovascular disease by helping rid the body of cholesterol.

Since then, thousands of studies have confirmed and refined these results. One of the best comes from a team led by Lars Sjöström at the University of Göteborg in Sweden, who studied the effect of weight changes on cardiovascular risk factors in 842 severely obese patients, some of whom underwent surgery to reduce their weight. As the researchers reported in the November issue of *Obesity Research*, blood pressure and levels of triglycerides, HDL cholesterol, and insulin began improving at weight drops of 10% of body weight.

But although losing weight clearly improves metabolic risk factors in overweight people in the short run, it is unclear whether this effect will last. "Even if you maintain weight loss, we don't know whether cardiovascular risk factors will stay down after 5 to 10 years," Sjöström says. "That must be proven."

What's more, it has been hard to establish the benefits of losing weight on life expectancy. In fact, a number of prospective epidemiological studies have shown that weight loss actually increases mortality. These studies had an inherent problem, however. They failed to separate intentional weight loss from unintentional drops in weight, which are often caused by illness. As a result, the death rate among weight losers may have been artificially high because many of them were sick. "If you don't adequately control for underlying illness, what's good about weight loss may end up looking bad," says David Williamson, an epidemiologist with the Centers for Disease Control and Prevention in Atlanta.

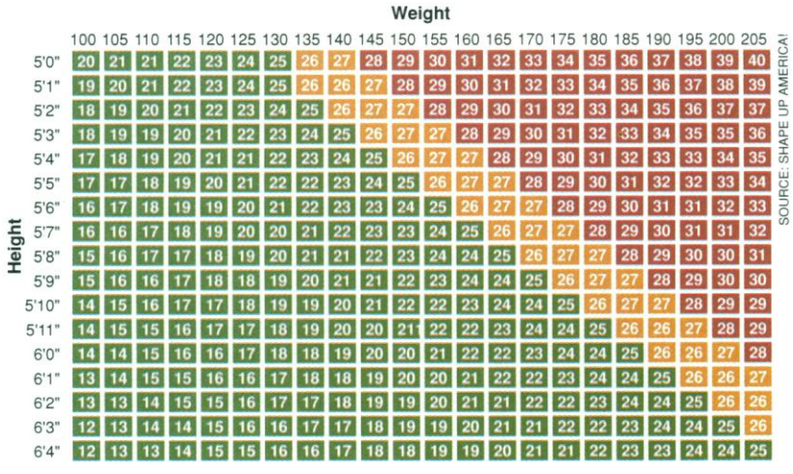
So in 1995, Williamson, along with Elsie Pamuk of the National Center for Health Statistics in Hyattsville, Maryland, and their colleagues reanalyzed data from 43,457 overweight middle-aged white women who had been asked about their history of intentional weight loss back in 1959 to '60 as part of the Cancer Prevention Study I and whose death rate was assessed 12 years later.

Williamson's team found that overweight women who intentionally lost weight and also had obesity-related health problems had a 20% mortality reduction. This was mostly due to a 40% to 50% decline in obesity-related cancers, such as those of the breast, uterus, and cervix, as well as a 30% to 40% decrease in diabetes-associated mortality. In as yet unpublished results, Williamson and his colleagues have seen similar mortality reductions, mostly due to drops in diabetes-linked deaths, for intentional weight loss in overweight men with obesity-related health problems.

But in both studies, the overweight men and women with no preexisting illnesses who had intentionally lost weight showed no consistent reduction in mortality. "There is not good evidence that intentional weight loss in obese people without obvious comorbidities is beneficial," Williamson says. He speculates that some people may be resistant to the health effects of obesity.

Other health experts emphasize that recommending weight loss is often futile, in any case. As a result, given the considerable effort, and in many cases, expense, required to lose weight, some physicians conclude that it simply may not be worth it. "Until we have better data about the risks of being overweight and the benefits and risks of trying to lose weight, we should remember that the cure for obesity may be worse than the condition," write Jerome Kassirer and Marcia Angell, editors of *The New England Journal of Medicine*, in a 1 January editorial.

Instead, these critics of obligatory weight loss favor emphasizing a healthier lifestyle, including exercise and an improved diet. Last year, researchers reported that participants in the Dietary Approaches to Stop Hypertension Trial could lower their blood pressure within 2 weeks by consuming more fruits and vegetables and less saturated fat—without losing weight. Says Blair: "I think we



Where do you stand? The chart shows how BMIs (numbers in squares) vary with weight and height. Some think that BMIs of 26 to 27 carry moderate health risks, with risks increasing further as BMIs rise.

should emphasize behavior, eating a healthful diet, and regular physical activity, and not focus so much on the scale."

But others, such as Baylor's Foreyt, disagree. Given the epidemiological evidence linking obesity and disease, he says, weight loss itself is likely to be beneficial. He says that people with a BMI of 27 should "certainly" slim down, as should thinner people who have other risk factors like high blood pressure.

Adds Alison Field of Brigham and Women's Hospital in a 16 April letter to the editor in *The New England Journal*: "Even a modest degree of excess weight is associated with an increased risk of hypertension and diabetes, ... and clinicians would be remiss if they didn't discuss weight loss and weight maintenance with their overweight patients."

People on both sides of the debate can agree about one thing, however. An ounce of prevention is worth more than a pound of cure. Adults in their 20s and 30s, in particular, often gain a lot of weight and would be well advised not to do so. "Preventive measures are better than beating on obese people, who really can't do anything about it," Kassirer says. Brigham's Manson concurs: "My recommendation is to avoid exceeding a BMI of 25 by avoiding substantial weight gain during adulthood."

Perhaps, in the future, new medications may help those who need them to battle their weight (see p. 1383). But until then, as exercise physiologist Glenn Gaesser of the University of Virginia, Charlottesville, writes in another letter to *The New England Journal*, we might be wise "to heed one of Hippocrates' more insightful, if less well-known, aphorisms: 'Do not allow the body to attain extreme thinness, for that, too, is treacherous, but bring it only to a condition that will naturally continue unchanged, whatever that may be.' "

–Ingrid Wickelgren

Additional Reading

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DEMOGRAPHICS

As Obesity Rates Rise, Experts Struggle to Explain Why

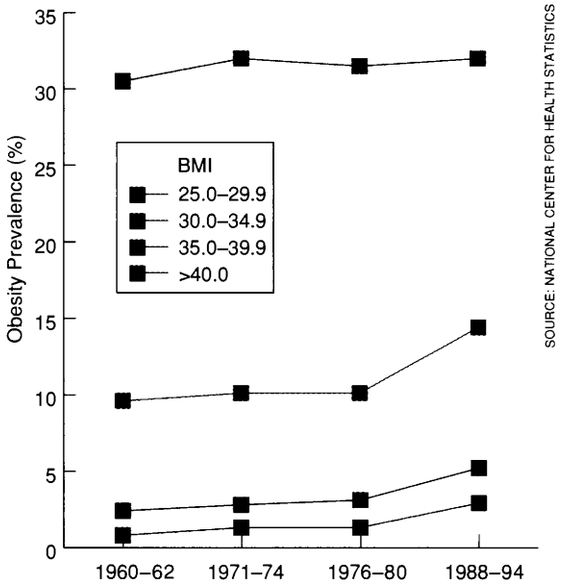
In the United States of the 1990s, signs of health consciousness are everywhere—except at people's waistlines. Low-fat foods, health clubs, and athletic gear have become multibillion-dollar industries, with Nike and Gatorade seemingly only slightly less ubiquitous than Microsoft. Statistics suggest that this health awareness is paying off. Since the early 1960s, blood pressure and blood cholesterol levels have been dropping, while rates of coronary heart disease mortality have declined by more than half. Given these trends, you might expect to see a trim, well-toned population, but you don't.

Since 1980, weights in the United States have been inflating at an alarming rate—and the rest of the world seems to be following suit (see sidebar). Currently, 22.5% of the U.S. population is considered to be clinically obese—compared to only 14.5% in 1980—and the end to the increase does not appear to be in sight. What's more, this "obesity epidemic," as many public health experts call it, affects all demographic groups, including children.

Much less clear is what's behind the increase, especially the big leap that seems to have occurred in the 1980s. Although many researchers blame increased food availability and declining physical activity (see p. 1371), "we don't have a terrific answer," says Bill Dietz, who directs the division of nutrition and physical activity at the Centers for Disease Control and Prevention (CDC). "We have not clearly identified the major changes in eating behavior or activity sufficient to account for the recent rapid increase in obesity."

The epidemic shows up mainly in data from the National Health and Nutrition Examination Surveys (NHANES), carried out by the National Center for Health Statistics (NCHS). So far there have been four data "cycles," covering the years 1960 to 1962 (known as the National Health Examination Survey or NHES), 1971 to 1974 (NHANES I), 1976 to 1980 (NHANES II), and the latest, conducted from 1988 to 1994 (NHANES III). The surveys include both interviews in the home and physical examinations and are considered to be a realistic portrait of the state of American health. "Through a very complex sampling process, they are felt to be representative of the U.S. population—across all ages, income strata, and ethnic groups," says Bill Harlan, head of the Office of Disease Prevention at the National Institutes of Health (NIH).

The NHES survey, completed in 1962, found that 12.8% of the population was obese, with obesity defined as having a body mass index (BMI) greater than 30. [The BMI is calculated by dividing a person's weight in kilograms by their height in meters squared. By this measure, a 5'10" (1.78 m) individual would be considered overweight at 175 pounds (80 kg) and obese at 210 pounds (95 kg).] The prevalence of obesity increased only modestly in the next 2 decades, going to 14.1% in the NHANES of 1971 to 1974 and 14.5% in the NHANES II of 1976 to 1980. But then the epidemic apparently set in.



Going up. With the possible exception of preobesity (BMIs from 25.0 to 29.9), the prevalence of all classes of obesity seems to have ticked upward during the 1980s.

By NHANES III, completed in 1994, the prevalence of obesity had increased by more than half, to 22.5% of the population. By the end of the survey, some 55% of the total population was officially considered overweight. "That is the big jump that has everyone concerned and surprised," says NCHS epidemiologist Katherine Flegal. Adding to the concern, the prevalence of obesity was slightly higher in the second 3 years of NHANES III than in the first, an indication