

# ISSUE

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## Does Obesity Increase the Risk of Premature Death?

**YES:** Harvard T.H. Chan School of Public Health, from "As Overweight and Obesity Increase, So Does Risk of Dying Prematurely," *Harvard T.H. Chan School of Public Health* (2016)

**NO:** Harriet Brown, from "The Weight of the Evidence," *Medical Examiner* (2015)

### Learning Outcomes

After reading this issue, you will be able to:

- Understand the difference between obesity and overweight.
- Explain the types of illnesses associated with being overweight and obese.
- Discuss the relationship between obesity and premature death.

### ISSUE SUMMARY

**YES:** The editors of the Harvard T.H. Chan School of Public Health argue that being overweight or obese is clearly associated with a higher risk of dying prematurely than being normal weight.

**NO:** Writer Harriet Brown maintains that obese individuals with chronic diseases fare better and live longer than those of normal weight.

In 1960, approximately 10 percent of adult males and 15 percent of adult females in the United States were obese. Fifty years later, those numbers had risen to 32.2 and 35.5 percent, respectively. The same pattern has occurred in most other developed nations, but it has generally been less pronounced than in the United States. The rates of obesity in the United States during the late 1970s were already higher than the rates in most of the other high-income countries today. Obesity and overweight are assessed using body mass index (BMI), a height-weight ratio. BMI is used as a screening tool to determine underweight, healthy weight, overweight, and obesity. For example, a 5'9" person is considered at a healthy weight at 125–168 pounds, overweight at 169–202 pounds, and obese if greater than 203 pounds.

Obesity is linked to various diseases, it leads to different types of disability, and it shortens lives. The most

common effects of obesity include diabetes; high blood pressure; heart disease; gallstones; and certain cancers, such as colorectal cancer, breast cancer in women, endometrial cancer, and cancers of the kidney, pancreas, liver, and gallbladder. Type 2 diabetes, most typically adult-onset, is particularly sensitive to body weight, is uncommon in people of normal weight, and the risk for developing it increases rapidly with increasing weight. The risks of developing high blood pressure, coronary heart disease, and gallstones also grow as obesity increases, as do the risks for the various obesity-related cancers, but none of these conditions are as sensitive to body weight as diabetes. Worldwide, the countries with the highest rates of obesity were those hardest hit by diabetes and heart disease in older adults.

Among older adults, obesity is also correlated with various types of disabilities. Excess weight can make it difficult to engage in certain activities, such as climbing stairs or walking for long distances, and it frequently leads to

joint problems. These limitations are often worsened by the various chronic diseases associated with obesity which can also cause disabilities.

The effect of being overweight or obese on the risk of dying has been an area of rather contentious debate. A recent study reviewed the mortality risk and years of life lost due to different levels of obesity, breaking the numbers down by age, gender, race, and smoking status and found in general, that being *overweight* does not increase mortality risk and sometimes decreases it, although the effect usually is not statistically significant either way. Obesity, however, has a greater effect on years of life lost for men than for women and for Whites than for African Americans, and its effects are similar for smokers and non-smokers, with smoking adding greatly to the mortality risk for all groups.

Since obesity increases mortality in at least some groups, it's unclear whether this obesity-mortality connection combined with the higher rates of obesity in the United States might explain at least part of this country's lower-than-expected life expectancy. Since life expectancy at age 50 in the United States would increase significantly more than in other countries through the hypothetical elimination of obesity, the U.S. longevity shortfall would be reduced and in some cases eliminated.

It is well known that Americans have, on average, higher weight for a particular height than people in other developed countries. It is also well known that obesity is associated with a variety of negative health effects, such as diabetes, heart disease, high blood pressure, and certain types of cancer. So it is natural to ask whether the higher rates of obesity in the United States may help explain the divergence in life expectancy trends that has been observed over the past quarter of a century. It may seem obvious that the heavier one is, the greater likelihood of a shorter

life expectancy, however, the data can be confusing and not always clear. Complicating the discussion of weight and mortality is the fact that as weight decreases *below* normal range, mortality increases. However, the relationship between weight and mortality may vary depending on the people examined and how other variables are taken into account. Smoking is an example of another health behavior that is related to obesity. It is usually related to lower weight, and giving up smoking can produce weight gain. In addition, people who have been overweight or obese at any time during their lives may be more likely to die prematurely, even if they lose weight later.

The obesity paradox is a medical hypothesis which states that obesity may actually protect from disease and increase longevity especially among the very old and among people with certain chronic diseases. The paradox further assumes that normal to low BMI may actually be harmful and linked to higher death rates among individuals without disease symptoms. The paradox was first described in 1999 based on the studies of overweight and obese people with kidney failure. Later studies found the same paradox among those with heart failure and chronic obstructive pulmonary disease. In people with heart disease, those with a BMI in the obese range had lower death rates than those at a healthy weight. This was later attributed to the fact that people lose weight as they become sicker and sicker. The paradox has been criticized on poor study design as well as BMI may not be a valid measure of health and weight.

The editors of the Harvard School of Public Health argue that being overweight or obese is clearly associated with a higher risk of dying prematurely than being at a healthy weight. Writer Harriet Brown disagrees and maintains that obese individuals with chronic diseases fare better and live longer than those of a healthy weight.



YES 

Harvard T.H. Chan School of Public Health

## As Overweight and Obesity Increase, So Does Risk of Dying Prematurely

### New Study Provides Strong Evidence on Dangers of Excess Weight

**B**eing overweight or obese is associated with a higher risk of dying prematurely than being normal weight—and the risk increases with additional pounds, according to a large international collaborative study led by researchers at the Harvard T.H. Chan School of Public Health and the University of Cambridge, UK. The findings contradict recent reports that suggest a survival advantage to being overweight—the so-called “obesity paradox.”

The study was published online on July 13, 2016, in *The Lancet*.

The deleterious effects of excess body weight on chronic disease have been well documented. Recent studies suggesting otherwise have resulted in confusion among the public about what is a healthy weight. According to the authors of the new study, those prior studies had serious methodological limitations. One common problem is called reverse causation, in which a low body weight is the result of underlying or preclinical illness rather than the cause. Another problem is confounding by smoking because smokers tend to weigh less than nonsmokers but have much higher mortality rates.

“To obtain an unbiased relationship between body mass index (BMI) and mortality, it is essential to analyze individuals who never smoked and had no existing chronic diseases at the start of the study,” said Frank Hu, a professor of nutrition and epidemiology at Harvard Chan School and a coleader of the collaboration. Hu stressed that doctors should continue to counsel patients regarding the deleterious effects of excess body weight, which include a higher risk of diabetes, cardiovascular disease, and cancer.

In order to provide more definitive evidence for the association of excess body weight with premature

mortality, researchers joined forces in 2013 to establish the Global BMI Mortality Collaboration, which involves over 500 investigators from over 300 global institutions.

“This international collaboration represents the largest and most rigorous effort so far to resolve the controversy regarding BMI and mortality,” said Shilpa Bhupathiraju, research scientist in the Department of Nutrition at Harvard Chan School and colead author of the study.

For the new study, consortium researchers looked at data from more than 10.6 million participants from 239 large studies, conducted between 1970 and 2015, in 32 countries. A combined 1.6 million deaths were recorded across these studies, in which participants were followed for an average of 14 years. For the primary analyses, to address potential biases caused by smoking and preexisting diseases, the researchers excluded participants who were current or former smokers, those who had chronic diseases at the beginning of the study, and any who died in the first five years of follow-up, so that the group they analyzed included 4 million adults. They looked at participants’ BMI—an indicator of body fat calculated by dividing a person’s weight in kilograms by their height in meters squared ( $\text{kg}/\text{m}^2$ ).

The results showed that participants with BMI of 22.5 to  $<25 \text{ kg}/\text{m}^2$  (considered a healthy weight range) had the lowest mortality risk during the time they were followed. The risk of mortality increased significantly throughout the overweight range: a BMI of 25 to  $<27.5 \text{ kg}/\text{m}^2$  was associated with a 7 percent higher risk of mortality, a BMI of 27.5 to  $<30 \text{ kg}/\text{m}^2$  was associated with a 20 percent higher risk, a BMI of 30.0 to  $<35.0 \text{ kg}/\text{m}^2$  was associated with a 45 percent higher risk, a BMI of 35.0 to  $<40.0 \text{ kg}/\text{m}^2$  was associated with a 94 percent higher risk, and a BMI of 40.0 to  $<60.0 \text{ kg}/\text{m}^2$  was associated with a

nearly three-fold risk. Every five units higher BMI above 25 kg/m<sup>2</sup> was associated with about 31 percent higher risk of premature death. Participants who were underweight also had a higher mortality risk.

Looking at specific causes of death, the study found that, for each five-unit increase in BMI above 25 kg/m<sup>2</sup>, the corresponding increases in risk were 49 percent for cardiovascular mortality, 38 percent for respiratory disease mortality, and 19 percent for cancer mortality. Researchers

also found that the hazards of excess body weight were greater in younger than in older people and in men than in women.

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**THE HARVARD T.H. CHAN SCHOOL OF PUBLIC HEALTH** (formerly **Harvard School of Public Health**) is the public health graduate school of Harvard University, located in Boston, MA.



Harriet Brown



## The Weight of the Evidence

### It's Time to Stop Telling Fat People to Become Thin

If you're one of the 45 million Americans who plan to go on a diet this year, I've got one word of advice for you: Don't.

You'll likely lose weight in the short term, but your chance of keeping it off for five years or more is about the same as your chance of surviving metastatic lung cancer: 5 percent. And when you do gain back the weight, everyone will blame *you*. Including you.

This isn't breaking news; doctors know the holy trinity of obesity treatments—diet, exercise, and medication—don't work. They know yo-yo dieting is linked to heart disease, insulin resistance, higher blood pressure, inflammation, and, ironically, long-term weight gain. Still, they push the same ineffective treatments, insisting they'll make you not just thinner but healthier.

In reality, 97 percent of dieters regain everything they lost and then some within three years. Obesity research fails to reflect this truth because it rarely follows people for more than 18 months. This makes most weight-loss studies disingenuous at best and downright deceptive at worst.

One of the principles driving the \$61 billion weight-loss industries is the notion that fat is inherently unhealthy and that it's better, healthwise, to be thin, no matter what you have to do to get there. But a growing body of research is beginning to question this paradigm. Does obesity *cause* ill health, *result* from it, both, or neither? Does weight loss lead to a longer, healthier life for most people?

Studies from the Centers for Disease Control and Prevention repeatedly find the lowest mortality rates among people whose body mass index (BMI) puts them in the "overweight" and "mildly obese" categories. And recent research suggests that losing weight doesn't actually improve health biomarkers such as blood pressure, fasting glucose, or triglyceride levels for most people.

So why, then, are we so deeply invested in treatments that not only fail to do what they're supposed to—make people thinner and healthier—but often actively makes people fatter, sicker, and more miserable?

Weight inched its way into the American consciousness around the turn of the 20th century. "I would sooner die than be fat," declared Amelia Summerville, author of the 1916 volume *Why Be Fat? Rules for Weight-Reduction and the Preservation of Youth and Health*. (She also wrote, with a giddy glee that likely derived from malnutrition, "I possibly eat more lettuce and pineapple than any other woman on earth!") As scales became more accurate and affordable, doctors began routinely recording patients' height and weight at every visit. Weight-loss drugs hit the mainstream in the 1920s, when doctors started prescribing thyroid medications to healthy people to make them slimmer. In the 1930s, 2,4-dinitrophenol came along, sold as DNP, followed by amphetamines, diuretics, laxatives, and diet pills like fen-phen, all of which caused side effects ranging from the annoying to the fatal.

The national obsession with weight got a boost in 1942, when the Metropolitan Life Insurance Company crunched age, weight, and mortality numbers from policyholders to create "desirable" height and weight charts. For the first time, people (and their doctors) could compare themselves to a standardized notion of what they "should" weigh. And compare they did, in language that shifted from words like *chubby* and *plump* to the more clinical-sounding *adipose*, *overweight*, and *obese*. The word *overweight*, for example, suggests you're over the "right" weight. The word *obese*, from the Latin *obesus*, or "having eaten until fat," conveys both a clinical and a moral judgment.

In 1949, a small group of doctors created the National Obesity Society, the first of many professional associations meant to take obesity treatment from the margins to the

mainstream. They believed that “any level of thinness was healthier than being fat, and the thinner a person was, the healthier she or he was,” writes Nita Mary McKinley, a psychologist at the University of Washington Tacoma. This attitude inspired a number of new and terrible treatments for obesity, including jaw wiring and stereotactic brain surgery that burned lesions into the hypothalamus.

Bariatric surgery is the latest of these. In 2000, about 37,000 bariatric surgeries were performed in the United States; by 2013, the number had risen to 220,000. The best estimates suggest that about half of those who have surgery regain some or all of the weight they lose. While such surgeries are safer now than they were 10 years ago, they still lead to complications for many, including long-term malnutrition, intestinal blockages, disordered eating, and death. “Bariatric surgery is barbaric, but it’s the best we have,” says David B. Allison, a biostatistician at the University of Alabama at Birmingham (UAB).

Reading the research on obesity treatments sometimes feels like getting stuck in an M.C. Escher’s illustration, where walls turn into ceilings and water flows upward. You can find studies that “prove” the merit of high-fat/low-carb diets and low-fat/high-carb diets, and either 30 min of daily aerobic exercise or 90 min. You’ll read that fen-phen is safe (even though the drug damaged heart valves in a third of those who took it). Studies say that orlistat (which causes liver damage and “uncontrollable” bowel movements) and sibutramine (which ups the risk of heart attacks and strokes) are effective. After reading literally more than a thousand studies, each of them claiming some nucleus of truth, the only thing I know for sure is that we really don’t know weight and health at all.

“We make all these recommendations, with all this apparent scientific precision, but when it comes down to it we don’t know, say, how much fat someone should have in their diet,” says Asheley Skinner, a pediatrician at the University of North Carolina at Chapel Hill School of Medicine. “We argue like we know what we’re talking about, but we don’t.”

For instance, much of the research assumes that when fat people lose weight, they become “healthy” in the same ways as a thinner person is healthy. The evidence says otherwise. “Even if someone loses weight, they will always need fewer calories and need to exercise more,” says Skinner. “So we’re putting people through something we know will probably not be successful anyway. Who knows what we’re doing to their metabolisms.”

Debra Sapp-Yarwood, a fiftysomething from Kansas City, Missouri, who’s studying to be a hospital chaplain, is one of the three percenters, the select few who have lost a chunk of weight and kept it off. She dropped 55 pounds

11 years ago and maintains her new weight with a diet and exercise routine most people would find unsustainable: she eats 1,800 calories a day—no more than 200 in carbs—and has learned to put up with what she describes as “intrusive thoughts and food preoccupations.” She used to run for an hour a day, but after foot surgery, she switched to her current routine: a 50-min exercise video performed at twice the speed of the instructor, while wearing ankle weights and a weighted vest that add between 25 and 30 pounds to her small frame.

“Maintaining weight loss is not a lifestyle,” she says. “It’s a job.” It’s a job that requires not just time, self-discipline, and energy—it also takes up a lot of mental real estate. People who maintain weight loss over the long term typically make it their top priority in life. Which is not always possible or desirable.

While concerns over appearance motivate a lot of would-be dieters, concerns about health fuel the national conversation about the “obesity epidemic.” So how bad is it, healthwise, to be overweight or obese? The answer depends in part on what you mean by “health.” Right now, we know obesity is *linked* with certain diseases, most strongly type 2 diabetes, but as scientists are fond of saying, correlation does not equal causation. Maybe weight gain is an early symptom of type 2 diabetes. Maybe some underlying mechanism causes both weight gain and diabetes. Maybe weight gain causes diabetes in some people but not others. People who lose weight often see their blood sugar improve, but that’s likely an effect of calorie reduction rather than weight loss. Type 2 diabetics who have bariatric surgery go into complete remission after only seven days, long before they lose much weight, because they’re eating only a few hundred calories a day.

Disease is also attributed to what we eat (or don’t), and here, too, the connections are often assumed to relate to weight. For instance, eating fast food once a week has been linked to high blood pressure, especially for teens. And eating fruits and vegetables every day is associated with lower risk of heart disease. But it’s a mistake to simply assume weight is the mechanism linking food and disease. We have yet to fully untangle the relationship.

Higher BMIs have been linked to a higher risk of developing type 2 diabetes, heart disease, and certain cancers, especially esophageal, pancreatic, and breast cancers. But weight loss is not necessarily linked to lower levels of disease. The only study to follow subjects for more than five years, the 2013 Look AHEAD study, found that people with type 2 diabetes who lost weight had just as many heart attacks, strokes, and deaths as those who didn’t.

Not only that, since 2002, study after study has turned up what researchers call the “obesity paradox”:

Obese patients with heart disease, heart failure, diabetes, kidney disease, pneumonia, and many other chronic diseases fare better and live longer than those of normal weight.

Likewise, we don't fully understand the relationship between weight and overall mortality. Many of us assume it's a linear relationship, meaning the higher your BMI, the higher your risk of early death. But Katherine Flegal, an epidemiologist with the CDC, has consistently found a J-shaped curve, with the highest death rates among those at either end of the BMI spectrum and the *lowest* rates in the overweight and mildly obese categories.

Study after study has turned up the "obesity paradox": obese patients with disease live longer than those of normal weight.

None of this stops doctors and researchers from recommending weight loss for health reasons. Donna Ryan, professor emerita at the Pennington Biomedical Research Center in Baton Rouge, co-chaired the National Institutes of Health panel that recently developed new guidelines for treating obesity, including calorie-restricted diets and commercial diet programs. "Those who have a BMI of 30 and up need treatment, no questions asked," they wrote. I asked Ryan why, given that so few people keep weight off and given the risks of yo-yo dieting, the committee backed the same old ineffective treatments. "I'm not familiar with any of the research that says yo-yoing is bad for you," Ryan told me. "I'm not convinced there's any harm whatsoever in losing and regaining weight."

Why do doctors keep prescribing treatments that don't work for a condition that's often benign? I suspect one reason lies in the fanaticism that often seems to drive the public debate around weight. Last January, for instance, when Flegal's meta-analysis showing a low risk of death for overweight people hit the news, one of its most vocal critics was Walter Willett, an epidemiologist at the Harvard School of Public Health. He told a reporter from NPR, "This study is really a pile of rubbish, and no one should waste their time reading it." A month later, Willett organized a symposium at Harvard *just to attack Flegal's findings*.

Willett's career, like countless others', has been built on the obesity-will-kill-you paradigm. Tam Fry, a spokesperson for the National Obesity Forum in the U.K., also dissed Flegal's work. "This is a horrific message to put out," he told the BBC. "We shouldn't take it for granted that we can cancel the gym, that we can eat ourselves to death with black forest gateaux."

Actually, Flegal's findings suggest nothing of the kind. But Willett, Fry, and others seem to see them as a dangerous challenge to a fundamental truth. UCLA

sociologist Abigail Saguy, author of *What's Wrong With Fat?*, says people are often invested in their own thin privilege. "They want to think they've earned it by working hard and counting calories, and they cling to it," she says.

There's a lot of money at stake in treating obesity. The American Medical Association—against the recommendations of its own Committee on Science and Public Health—recently classified obesity as a disease, and doctors hope insurers will start covering more treatments for obesity. If Medicare goes along with the AMA and designates obesity as a disease, doctors who discuss weight with their patients will be able to add that diagnosis code to their bill and charge more for the visit.

Obesity researchers and doctors also defend what appear to be financial conflicts of interest. In 2013, the *New England Journal of Medicine* published "Myths, Presumptions, and Facts About Obesity." The authors dismissed the often-observed link between weight cycling and mortality, saying it was "probably due to confounding by health status" (code for "We just can't believe this could be true") and went on to plug meal replacements like Jenny Craig, medications, and bariatric surgery.

Five of the 20 authors disclosed financial support from sponsors in related industries, including UAB's David Allison. I asked him how he would respond to allegations of financial self-interest. "It would be no different than anybody saying about any other person who puts forth an idea, 'I want to comment that you have this background or personality, this sexual orientation, weight, gender, or race,'" he argued. "These conflicts were disclosed, we didn't hide them, we weren't ashamed of them. And what's your point?"

Another layer to the onion may lie in our deeply held cultural assumptions around weight. "People, journalists, and researchers live in a world where it's taken for granted that fat is bad and thin is good," says Saguy.

Doctors buy into those assumptions and biases even more heavily than the rest of us, which may explain in part why they continue to blame patients who can't keep weight off. Joseph Majdan, a cardiologist who teaches at Jefferson Medical College in Philadelphia, has lost and regained the same 100 or so pounds more times than he can count. Some of the meanest comments Majdan has heard about his weight have come from other doctors, like the medical school classmate who asked if she could project slides onto a pair of his white intern's pants for a skit. Or the colleague who asked him, "Aren't you disgusted with yourself?"

"When a person has recurrent cancer, the physician is so empathetic," says Majdan. "But when a person regains weight, there's disgust. And that is morally and professionally abhorrent."

The idea that obesity is a choice, that people who are obese lack self-discipline or are gluttonous or lazy, is deeply ingrained in our public psyche. And there are other costs to this kind of judgmentalism. Research done by Lenny Vartanian, a psychologist at the University of New South Wales, suggests that people who believe they're worthless because they're not thin, who have tried and failed to maintain weight loss, are less likely to exercise than fat people who haven't strongly internalized weight stigma.

It's hard to think of any other disease—if you want to call it that—where treatment rarely works and most people are blamed for not “recovering.”

Over the years, Robin Flamm, a full-time parent from Portland, Oregon, has bounced in and out of Weight Watchers and Overeaters Anonymous, gone paleo, done Medifast. Everything worked—for a while. She'd lose 30 pounds and gain back 35, lose 35, and regain 40. She thought she needed to exercise more, eat less, and work harder. Like most of us, she blamed herself.

At age 48, she decided she'd spent enough time hating her body, wishing herself different, feeling like a failure. She started seeing a therapist who offers an approach called Health at Every Size, although she was skeptical at first. In the current “obesity epidemic” climate, the idea of pursuing health separate from weight, of accepting that people come in many shapes and sizes, feels radical.

It's hard to think of any other disease where treatment rarely works and most people are blamed for not “recovering.”

She felt both terrified and relieved to put away her scale, delete her calorie-counting app, and start to rethink her beliefs around food and health. While most obesity docs insist that restrained eating—counting calories or

points or exchanges—is necessary for good health, not everyone agrees. About 10 years ago, Ellyn Satter, a dietitian and therapist in Madison, Wisconsin, developed a concept she calls eating competence, which encourages internal self-regulation about what and how much to eat rather than relying on calorie counts or lists of “good” and “bad” foods. Competent eaters, says Satter, enjoy food; they're not afraid of it. And there's solid evidence that competent eaters score better on cardiovascular risk markers like total cholesterol, blood pressure, and triglycerides than noncompetent eaters.

Not that abiding by competent eating, which fits the Health at Every Size paradigm, is easy; Robin Flamm would tell you that when her clothes started to feel a little tighter, she panicked. Her first impulse was to head back to Weight Watchers. Instead, she says, she asked herself if she was eating mindfully, if she was exercising in a way that gave her pleasure, if she, maybe, needed to buy new clothes. “It's really hard to let go of results,” she says. “It's like free falling. And even though there's no safety net ever, really, this time it's knowing there's no safety net.”

One day she was craving a hamburger, a food she wouldn't typically have eaten. But that day, she ate a hamburger and fries for lunch. “And I was done. End of story,” she says, with a hint of wonder in her voice. No cravings, no obsessing over calories, no weeklong binge-and-restrict, no “feeling fat,” and staying away from exercise. She ate a hamburger and fries, and nothing terrible happened. “I just wish more people would get it,” she says.

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**HARRIET BROWN** is a writer and the author of “Body of Truth: How Weight-and What We Can Do About it.”



## EXPLORING THE ISSUE



### Does Obesity Increase the Risk of Premature Death?

#### Critical Thinking and Reflection

1. Why is there an increased risk of premature death among the obese?
2. What are some explanations for the obesity paradox?
3. Why is body mass index not always a valid measurement of weight and health?

#### Is There Common Ground?

Carrying too many pounds is a clear indication of current or future health problems for most people but not for everyone. Some overweight or obese individuals seem to avoid the typical hazards associated with their weight and are often referred to as the metabolically healthy obesity. However, most people who are overweight or obese have changes in their metabolism which leads to risks such as high blood pressure, or elevated cholesterol, which can damage arteries in the heart and in other parts of the body. In addition, other changes include resistance to insulin which leads to elevated blood sugar. As a result of these changes, overweight or obese individuals are usually at a high risk of developing heart disease, stroke, or type 2 diabetes. The metabolically healthy person can often manage to avoid these physical changes and the diseases associated with them. Genes may play a role in how a person's body and metabolism respond to their body weight and may offer protection from developing insulin resistance and other changes while others are genetically programmed to store fat in less harmful parts of the body such as hips or thighs which are less a risk than storing fat around the abdomen.

Metabolically healthy obesity is rare, and researchers believe it doesn't offer lifelong protection from the hazards of obesity. Scientists believe that with aging, a reduction in exercise, or other changes, metabolically healthy obesity can change into unhealthy obesity. In addition, obesity can harm more than just metabolism. Excess weight can damage knee and hip joints, leads to sleep apnea and respiratory problems, and contributes to the development of cancer including breast, uterine, and colon. Overall, while some overweight or obese individuals may appear to be metabolically healthy, that may not be permanent and other health issues can occur.

#### Additional Resources

- Haomiao, J., Zack, M. M., Thompson, W. W. (2016). Population-based estimates of decreases in quality-adjusted life expectancy associated with unhealthy body mass index. *Public Health Reports*, 131, 177-184.
- Wilson, C. (2016, June 11). Fat lot of good. *New Scientist*, 230, 28-32.
- Bariatric Times (2017, January). Obesity and cardiovascular health. *Bariatric Times*, 14, 16.