



Value-Based
Obesity Management
& Cardiometabolic Health

Obesity Medical Impact

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Affecting more than 40% of the US adult population,¹ obesity is a metabolic disorder characterized by excess weight—particularly the gain of adipose (also known as fat) tissue in the stomach area.

Obesity is not a matter of appearance or a negative view of large bodies, nor is it the result simply of poor lifestyle choices or a one-size-fits-all issue with a single ready-made solution.

Instead, obesity is a chronic health condition that drives a wide range of over 200+ conditions—including metabolic and biomechanical conditions like hypertension, high cholesterol and sleep apnea as well as mental health conditions, implications for fertility and a heightened risk of cancer. Persistently rising rates of obesity may explain the emergence of disease in previously unaffected, populations such as diabetes in adolescence, chronic kidney disease (CKD) in middle age, and the well-publicized increase in cancer in young adults. Consequently, obesity has emerged as a leading public health challenge and a significant driver of medical impact. (Figure 1)

Obesity's medical impacts are also a profound health equity issue. Obesity is more prevalent among underrepresented communities and black and brown individuals,¹ individuals with lower socioeconomic status,² and lower levels of educational attainment.³

Implicit bias against individuals with obesity may exacerbate other equity issues;⁴ for example, there is a large—and growing—pay differential for individuals with obesity.⁵ Worse, obesity may drive persistency of health equity issues as obesity can be passed from generation to generation, based on hereditary, epigenetic, and environmental factors.⁶ Creating an equitable health system will be impossible without addressing the public health challenge of obesity.

In this white paper, we outline the medical impacts of obesity. Obesity is associated with a general increase in all-cause mortality, with risk increasing with the degree of obesity,⁷ and causes the development of new diseases, accelerates the progression of comorbid diseases, and interferes with their treatment.

Here we review these impacts across 5 categories: Metabolic conditions like diabetes and chronic kidney disease, mechanical conditions like osteoarthritis and obstructive sleep apnea, and even mental health (anxiety and depression), fertility, and risk for developing at least 13 obesity related cancers.



OBESITY IS



Metabolic disorder & imbalance



Chronic health condition



Public health challenge



A matter of appearance



Result of poor lifestyle choices

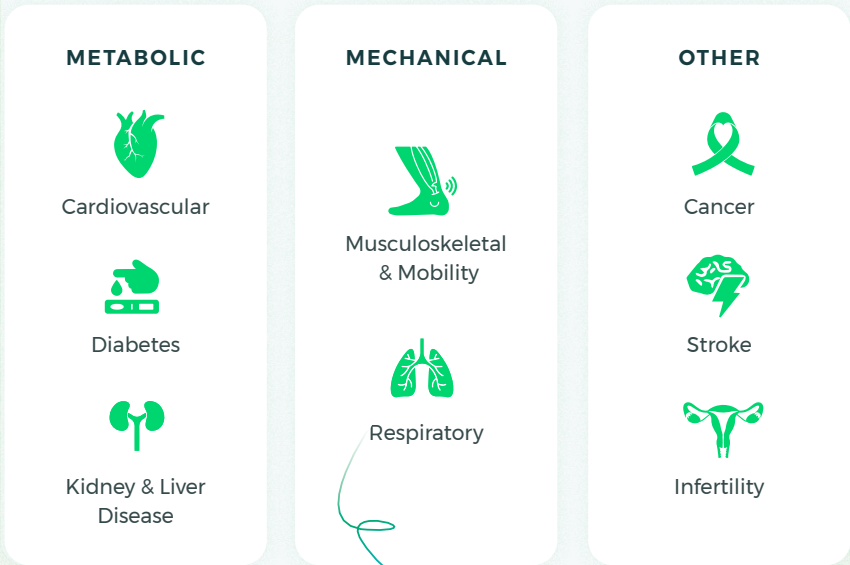


A one-size-fits-all issue

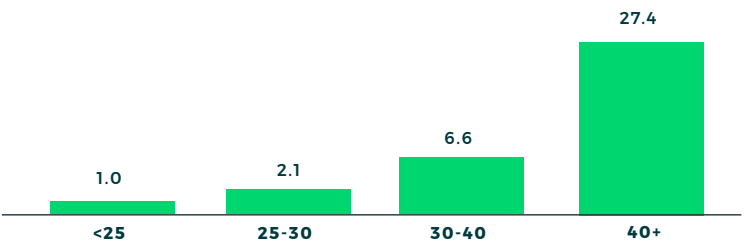
Metabolic Impact

Obesity is a major driver of the development of other metabolic conditions including diabetes, hypertension, dyslipidemia, cardiovascular disease, chronic kidney disease, and metabolic dysfunction-associated steatotic liver disease (MASLD) (see Figure 2). Worldwide, the increasing prevalence of obesity has corresponded with epidemic rise in hypertension,⁸⁻⁹ MASLD,¹⁰ and diabetes.¹¹⁻¹² Obesity may drive these changes because adipose tissue (i.e. belly fat) itself is metabolically active, and gaining belly fat actually alters the body's metabolism. Moreover, measuring one's weight does a bad job of capturing how large these impacts on metabolism can be because gaining and losing weight often happen in body fat faster than on the rest of the body.¹³

Figure 1: Costs Driven by Obesity Related Conditions



INCREASED OSA LIKEHOOD WITH BMI (50+)



Source: 65

BMI

BODY MASS INDEX

Body Mass Index (BMI) is a commonly used metric for assessing an individual's weight in a manner that respects the wide differences in height among humans.

To calculate BMI, take the ratio of an individual's weight (in kilograms) to the square of their height (in meters—when calculating BMI using the Imperial units—inches and pounds—multiply the weight by 703). Higher measurements of BMI typically correspond to higher levels of body fat, which can indicate metabolic disorders like obesity.

BMI is often used when discussing obesity because it is a convenient, readily available metric and can be measured with common household items such as measuring tape and scale. However, as one might imagine this simple to calculate number does not accurately or holistically capture a person's metabolic health, because it does not account for the diversity of human body shapes and sizes (e.g. shoulder and hip width) or compositions (such as the size of muscles or the density of bone).

As a result, BMI has been criticized because it does not provide a particularly deep or accurate picture of the health of an individual, yet is broadly used as a shorthand for health. Better measures include waist circumference or percent adipose tissue in body composition—although this requires medical imaging. We agree that there has been over-reliance on BMI: clinical diagnosis of obesity must rely on other measurements like metabolic panels from lab work.

At Ilant, we use BMI primarily as an organizational tool—it gives us a method to categorize and organize and compare data on individuals that may have been collected from many different sources (clinicians, the individual themselves, historical health system data in EMRs, or published academic papers).

Diabetes

Obesity is a driving force behind abnormal carbohydrate metabolism and insulin resistance which can lead to the development of prediabetes and its progression to Type 2 diabetes.¹⁴ As a result, diabetes is 6-10x more prevalent in individuals with obesity.¹⁵

However, this process evolves over a period of 3-6 years, during which interventions can slow and even reverse it. Indeed, modest weight loss (5-10%) can be effective in delaying the progression of diabetes;¹⁶⁻¹⁷ retrospectives on bariatric surgery have even demonstrated remission of diabetes of 27-58%¹⁸⁻¹⁹ and even higher levels of improvement.

Cardiovascular Risk: Hypertension & Hyperlipidemia

Cardiovascular disease is the number one cause of death in the US,²⁰ and obesity is a major cause and exacerbator of cardiovascular risk factors, including hypertension and hyperlipidemia. Obesity is believed to cause hypertension via sodium retention among other mechanisms, and treatment of hypertension often requires concurrent weight loss to be successful.⁹

Obesity is also associated with raised LDL or 'bad' cholesterol, with higher levels of obesity having cholesterol particles that are smaller, denser and more likely to cause arteries and lead to cardiovascular complications.²¹⁻²³

On the other hand, weight loss often brings corresponding improvements in blood pressure and cholesterol levels^{8, 9, 16, 21, 24}; and anti-obesity treatment with GLP-1s or bariatric surgery often achieves remission of hypertension of 60%²⁵ and significant reductions (20% for GLPs and 50-80% for bariatric) in major adverse cardiovascular events (MACE).²⁶⁻³⁰

Chronic Kidney Disease

Obesity dramatically raises the risk of chronic kidney disease (CKD) by increasing the burden of disease from hypertension and diabetes³¹ both of which can damage the kidneys.

Nearly 50% of individuals with CKD have obesity³¹ and greater obesity generally confers higher risk and severity of CKD. For example, individuals having Class 2 Obesity (BMI > 35) were twice as likely to have CKD than individuals with overweight or obesity;³² and the risk of end-stage renal disease (ESRD) doubles for individuals with Class 3 obesity compared to Class 1 (relative risks of 7.07 and 3.57).³³ Lastly, obesity also interferes with treatment for CKD and leads to poorer outcomes from dialysis and post-renal transplantation.³⁴⁻³⁶

Metabolic dysfunction-associated steatotic liver disease (MASLD)

Metabolic dysfunction—associated steatotic liver disease (MASLD) is abnormal accumulation of fat in the liver which can progress to metabolic dysfunction—associated steatohepatitis (MASH), cirrhosis, or liver failure.³⁷⁻⁴¹ Fat accumulation begins early in weight gain and is associated with other metabolic diseases, especially diabetes, CKD, dyslipidemia, and hypertension.⁴²⁻⁴⁷

MASLD may have downstream metabolic effects, such as insulin resistance, that increase the likelihood of developing diabetes and make it more difficult to treat diabetes, dyslipidemia, and hypertension.⁴⁸ Progression to later stage MASH can be a serious consequence and is the second leading cause of liver transplantation.⁴¹ Weight loss can improve MASLD, with greater weight loss having correspondingly greater benefit,⁴⁹ however, significant weight loss (least 10%) is typically needed for substantial improvement.^{37, 41, 49, 50} Bariatric surgery improves MASLD and in some cases can resolve MASH.^{51, 52}

Mechanical

Obesity impacts the body's mechanical functioning by putting additional strain on bones, nerves, cartilage, joints and tendons. This added biomechanical stress significantly raises the risk of low back pain (by 30-50%)⁵³⁻⁵⁶ and osteoarthritis (by 2x-10x).⁵⁷ For example, there is a direct linear relationship between increased weight and increased likelihood of developing osteoarthritis of the knee.⁵⁸ Along with the added biomechanical stress, the adipose tissue gained in obesity secretes pro-inflammatory chemicals as part of how it changes the body's metabolism, and this increased inflammation may accelerate development of osteoarthritis.⁵⁹

Obesity also complicates the mechanism of breathing by restricting the chest wall and adding pressure that restricts the movement of the diaphragm and reduces lung capacity.⁶⁰ Individuals with obesity have a higher prevalence of asthma⁶¹ and use more asthma controller and rescue medications, and have higher rates of ER visits and hospitalizations due to asthma.⁶²

Obesity can also lead to the partial or complete collapse of the airways during sleep, resulting in lowered levels of oxygen in the blood and disrupted sleep,⁶³ a condition known as obstructive sleep apnea (OSA). The risk of developing OSA increases with weight gain; for example the risk at Class 1 obesity is 2x whereas the risk triples to 7x at Class 3 BMI.⁶³⁻⁶⁴ For people over 50, Class 3 obesity is associated with a 27x higher risk of OSA⁶⁵ (See Figure 1). OSA plays a dramatic role in accelerating other cardiovascular diseases especially hypertension,⁶⁶⁻⁶⁸ and loss of oxygen and changes in blood pressure associated with OSA has been linked to increased mortality.⁶⁹

Even modest weight loss of 5% may reduce musculoskeletal pain, and the benefits increase with greater amounts of weight loss.^{59,70,71} Approximately 10% weight loss is associated with improvements in OSA and total lung capacity;^{64, 72, 73} and following bariatric surgery some asthma patients are able to stop all asthma drugs.

Mental Health

In addition to its metabolic and physical consequences, obesity has a dramatic two-way relationship with mental health.^{74, 75} Mental health conditions can be a contributing factor for obesity—eating disorders,^{76, 77} low serotonin levels due to depression, and the side effects of common antidepressants and antipsychotics can all cause weight gain.⁷⁸ Mental health disorders, such as depression and anxiety disorders, are often associated with decreased motivation and energy levels, leading to reduced physical activity and a more sedentary lifestyle which may accelerate weight gain.

Obesity can also exacerbate mental health conditions, especially anxiety disorders and depression. Individuals with obesity are 55% more likely to develop depression,⁷⁹ and obesity is associated with higher rates of anxiety disorder⁸⁰ and bipolar disorder.

On the other hand, intensive behavioral interventions for weight loss reduce symptoms of depression, and raise ratings of quality of life.⁸¹ An important caveat though is that pharmacological and bariatric interventions may also address obesity, but do not necessarily mitigate underlying mental health issues. Further, changes in self-perception related to significant weight loss from medication or bariatric surgery may also increase risk of self-harm and suicidality especially, for individuals without existing support or regular follow-ups.⁸²



Fertility

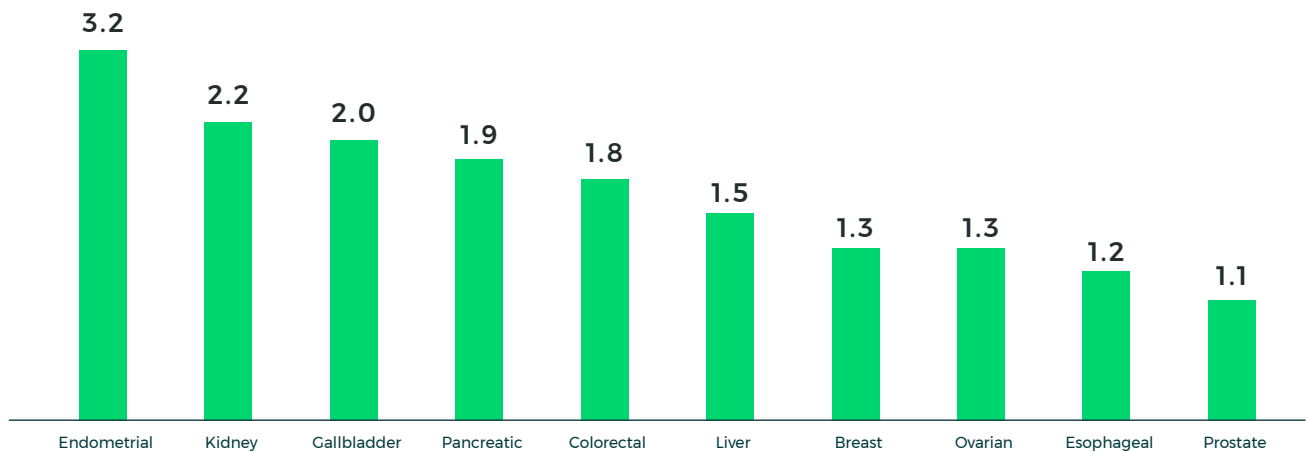
Obesity significantly impacts fertility for both men and women. For men, obesity can cause hypogonadism—a condition where lowered levels of testosterone negatively impact reproductive health and increase feelings of fatigue, irritability, and inability to concentrate.⁸³⁻⁸⁴

For women, obesity can cause menstrual cycle disturbance, and reduced fertility including a longer time to conception and potential infertility.⁸⁵ Obesity is associated with polycystic ovary syndrome (PCOS),^{86,87} in which ovarian cysts cause changes in circulating hormones which can also cause menstrual irregularities and infertility.^{88,89} Obesity also adds potentially severe complications for pregnancy, including a heightened risk of gestational diabetes, gestational hypertension, and preeclampsia (due to pre-existing comorbid hypertension).⁹⁰

Cancer

Obesity increases the prevalence of at least 13 cancers, including cancer of the thyroid, gallbladder, liver, pancreas, prostate, kidney, stomach, ovary, uterus, esophagus, as well as post-menopausal breast and colorectal cancer, ⁽⁹¹⁾ See Figure 3), and greater levels of obesity convey higher risk. Obesity may cause 5% of all cancers for men and 10% for women,⁹²⁻⁹³ and the consistent and increasing growth in obesity prevalence may be responsible for the growth of cancer rates in adolescents and young adults.⁹⁴ Although the mechanism by which obesity increases cancer rates is unclear, there is evidence that bariatric surgery lowers the relative risk of developing cancer.³⁰

Figure 2: Increase Prevalence of Cancer for Individuals with Obesity



Source: Data compiled from 95-98

Taken together, **obesity has an enormous impact as a chronic health condition in its own right and as a risk factor for many other chronic conditions which have profound implications on quality of life and longevity.**

Obesity negatively impacts metabolic health, cardiovascular health, mental health, musculoskeletal pain, sleep, breathing, fertility and risk of developing cancer—virtually the whole of an individual's experience in their body.

The bright side is that in case after case, we see that even moderate weight loss can also ameliorate these comorbidities and improve outcomes; greater levels of weight loss can even put some of these comorbidities into remission or reverse them entirely with correspondingly greater improvements in outcomes and quality of life.

This is why we at Ilant focus on determining the right level of treatment and support for each person engaging in our treatment programs and then deliver them via integrated care teams that can treat the whole-person.

WANT TO LEARN MORE?

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to learn more and
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