

# The Burden of Obesity-Related Cardiovascular Disease (CVD)

## Obesity is a rising health problem in the US<sup>1</sup>

According to the Centers for Disease Control and Prevention, obesity is a common, serious, and chronic disease. It is multifactorial and progressive in nature. It is classified as a body mass index (BMI) of  $\geq 30.0$  kg/m<sup>2</sup> in adults.<sup>1-4</sup>



~2 out of 5 adults (42%) struggle with obesity in the US, according to the 2017-March 2020 National Health and Nutrition Examination Survey (NHANES)<sup>5</sup>

The US obesity prevalence is **projected to increase to nearly 50% in adults by 2030** per an analysis published in 2019 using data from the BRFSS survey\* and NHANES<sup>6,†</sup>



\*Data from 1993-1994 and 1999-2016.<sup>6</sup>  
 †Data from 1991-1994 and 1999-2016.<sup>6</sup>

## Obesity is a risk factor for CVD and is associated with poor outcomes<sup>3,7</sup>

Obesity is an independent risk factor for CVD, in part due to its pathogenesis, which increases inflammation and contributes to progression of atherosclerosis.<sup>3,7,8</sup>

Obesity also contributes directly to certain risk factors for the development of CVD<sup>3,7</sup>:



Dyslipidemia

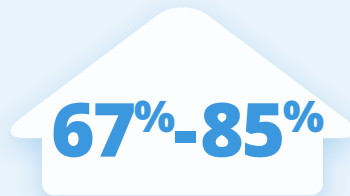


Type 2 Diabetes



Hypertension

A population-based study evaluating the lifetime risk estimates of incident CVD by weight status using pooled data of 190,672 in-person examinations found that **adults with obesity have a higher cumulative lifetime risk of incident CVD events and CVD death** compared with adults with a normal BMI.<sup>9,‡</sup>



Increased lifetime risk for first CVD event in middle-aged male and female patients with obesity, respectively, compared with patients with a normal BMI<sup>9,§,||</sup>



Increased lifetime risk of incident CHF in middle-aged adults with obesity compared to those with a normal BMI<sup>9,||</sup>

<sup>9</sup>Pooled data of adult patients aged 20-79 years old free of clinical CVD at baseline from 10 large US prospective cohort studies conducted over 1964-2015; middle-aged included adults with index age 40-59 years. Obesity was defined as BMI 30.0-39.9 kg/m<sup>2</sup>, and normal BMI defined as 18.5-24.9 kg/m<sup>2</sup>.<sup>9</sup>  
<sup>§</sup>CVD events included fatal and nonfatal myocardial infarction, fatal and nonfatal stroke, CHF, and cardiovascular death.<sup>9</sup>  
<sup>||</sup>Based on competing hazard ratios adjusted for age, race/ethnicity, and smoking status.<sup>9</sup>



According to a meta-analysis of 5 randomized studies consisting of 881,692 participants that assessed the extent of association between obesity and CVD, **obesity was significantly associated with an increased odds of coronary artery disease** (OR, 1.20; 95% CI, 1.02-1.41;  $P=0.03$ ;  $I^2=87\%$ ).<sup>10,¶</sup>

<sup>¶</sup> $I^2$  is a value used to assess heterogeneity across studies ( $I^2$  of 25%-50% indicating mild heterogeneity, 50%-75% indicating moderate heterogeneity, and >75% indicating severe heterogeneity).<sup>10</sup>

# Weight Loss Can Help Improve Certain CVD Risk Factors and Reduce Medical Costs Associated With Obesity<sup>11-13</sup>

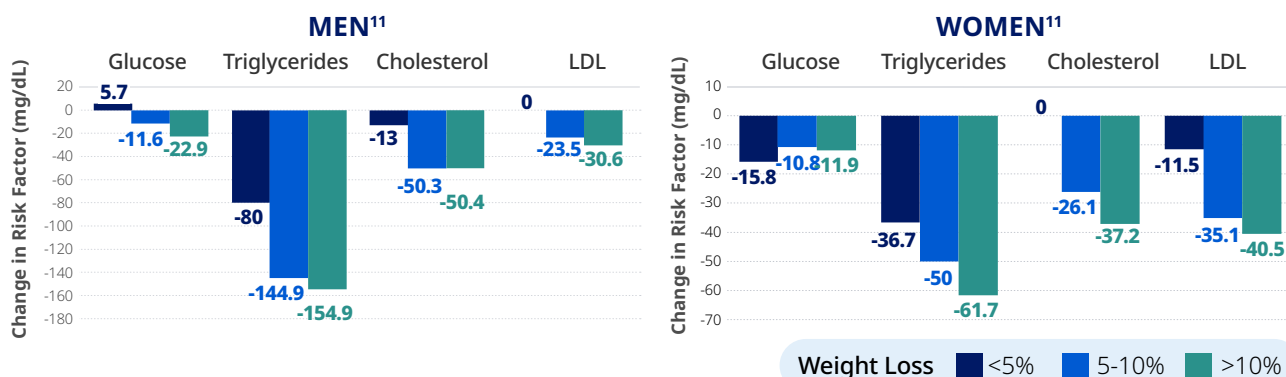
The high expenditure associated with obesity-related CVD results in substantial economic burden<sup>13,14</sup>



\*Direct medical costs of CHF, CHD, hypertension, and stroke attributable to obesity were reported in \$US 2018 and adjusted for inflation in 2023.<sup>13</sup>  
<sup>1</sup>Costs were reported in \$US 2018 and were adjusted for inflation in 2023.<sup>13</sup>

## Weight loss can help reduce medical costs and improve certain CVD risk factors<sup>3,11,12</sup>

One retrospective study examining data from 401 adults from 2003-2011 who enrolled in a weight-loss program discovered that patients considered high risk (those whose baseline risk factor screening values were outside the recommended limits) who lost >10% of their body weight, experienced greater reductions in fasting glucose, triglycerides, total cholesterol, and LDL cholesterol compared with high-risk patients who lost <10% of their body weight.<sup>11,5</sup>



<sup>5</sup>The weight-loss program was a 15-week program in which the patient's diet consisted of nutritional bars and shakes with 1 structured food-based meal per day, which transitioned to a food-based 1200 kcal/day diet after the first 8 weeks. Weekly physical activity goals were individualized, but patients were encouraged to achieve 150 min/week of moderate to vigorous physical activity. Patients also received weekly one-on-one visits with a registered dietitian, exercise physiologist, or psychology staff.<sup>11</sup>

## Predicted Annual Obesity-Related Medical Cost Savings for Adult Patients Without Type 2 Diabetes With Baseline BMI 30 kg/m<sup>2</sup> and 40 kg/m<sup>2</sup><sup>12,14,11</sup>

	BMI 30 kg/m <sup>2</sup>	BMI 40 kg/m <sup>2</sup>	BACKGROUND
5% reduction in BMI	\$353.25	\$875.01	This study, which used data from the 2000-2010 waves of the Medical Expenditure Panel Survey (MEPS), estimated a 5% reduction in BMI could lead to annual cost savings of \$353.25 for adult patients without type 2 diabetes with a baseline BMI of 30 kg/m <sup>2</sup> . <sup>12,14,5</sup>
10% reduction in BMI	\$674.14	\$1646.20	
15% reduction in BMI	\$965.55	\$2325.64	
20% reduction in BMI	\$1230.13	\$2924.07	

<sup>11</sup>Aggregated medical costs include inpatient, outpatient, prescription drugs, dental, vision, home healthcare services, and medical equipment, which were reported in \$US 2010 and were adjusted for inflation in 2023.<sup>12</sup>

The link between cardiovascular disease risk factors and obesity supports the use of an evidence-based comprehensive weight management program in patients with overweight or obesity.<sup>3,15</sup>

CHD, coronary heart disease; LDL, low-density lipoprotein; MEPS, Medical Expenditure Panel Surveys.

**References:** **1.** Centers for Disease Control and Prevention. About overweight & obesity. Accessed February 23, 2023. <https://www.cdc.gov/obesity/about-obesity/index.html> **2.** Centers for Disease Control and Prevention. Defining adult overweight & obesity. Accessed February 23, 2023. <https://www.cdc.gov/obesity/basics/adult-defining.html> **3.** Powell-Wiley TM, Poirier P, Burke LE, et al. Obesity and cardiovascular disease: a scientific statement from the American Heart Association. *Circulation*. 2021;143(21):e984-e1010. doi:10.1161/CIR.0000000000000973. **4.** Bray GA, Kim KK, Wilding JPH, World Obesity Federation. Obesity: a chronic relapsing progressive disease. A position statement of the World Obesity Federation. *Obes Rev*. 2017;18(7):715-723. **5.** Stierman B, Afzul J, Carroll M, et al. National Health and Nutrition Examination Survey 2017–March 2020 prepandemic data files development of files and prevalence estimates for selected health outcomes. *National Health Statistics Reports* No. 158. June 14, 2021. Accessed February 23, 2023. <https://stacks.cdc.gov/view/cdc/106273> **6.** Ward ZJ, Bleich SN, Cradock AL, et al. Projected U.S. state-level prevalence of adult obesity and severe obesity. *N Engl J Med*. 2019;381(25):2440-2450. doi:10.1056/NEJMsa1909301 **7.** Cercato C, Fonseca FA. Cardiovascular risk and obesity. *Diabetol Metab Syndr*. 2019;11:74. doi:10.1186/s13098-019-0468-0 **8.** Cooke JP. Endotheliopathy of obesity. *Circulation*. 2020;142(4):380-383. doi:10.1161/CIRCULATIONAHA.120.047574 **9.** Khan SS, Ning H, Wilkins JT, et al. Association of body mass index with lifetime risk of cardiovascular disease and compression of morbidity. *JAMA Cardiol*. 2018;3(4):280-287. doi:10.1001/jamacardio.2018.0022 **10.** Riaz H, Khan MS, Siddiqi TJ, et al. Association between obesity and cardiovascular outcomes: a systematic review and meta-analysis of mendelian randomization studies. *JAMA Netw Open*. 2018;1(7):e183788. doi:10.1001/jamanetworkopen.2018.3788 **11.** Brown JD, Buscemi J, Millsom V, Malcolm R, O'Neil PM. Effects on cardiovascular risk factors of weight losses limited to 5–10. *Transl Behav Med*. 2016;6(3):339-346. doi:10.1007/s13142-015-0353-9 **12.** Cawley J, Meyerhoefer C, Beiner A, et al. Savings in medical expenditures associated with reductions in body mass index among US adults with obesity, by diabetes status. *Pharmacoeconomics*. 2015;33(7):707-722. **13.** Lopez C, Bendix J, Sagynbekov K. Weighing down America: 2020 update. A community approach against obesity. December 2020. Accessed February 23, 2023. [https://milkeninstitute.org/sites/default/files/reports-pdf/Weighing%20Down%20America%20v12.3.20\\_0.pdf](https://milkeninstitute.org/sites/default/files/reports-pdf/Weighing%20Down%20America%20v12.3.20_0.pdf) **14.** US Bureau of Labor Statistics. CPI inflation calculator. Accessed February 23, 2023. [https://www.bls.gov/data/inflation\\_calculator.htm](https://www.bls.gov/data/inflation_calculator.htm) **15.** Ryan DH, Yockey SR. Weight loss and improvement in comorbidity: differences at 5%, 10%, 15%, and over. *Curr Obes Rep*. 2017;6(2):187-194. doi:10.1007/s13679-017-0262-y

