



The Truth About Obesity: Clinical Guidelines & Optimizing Care

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National obesity statistics



By 2030, nearly **1 in 2** adults in the United States are projected to have obesity (BMI ≥ 30 kg/m²), and nearly **1 in 4** adults are projected to have Class II or III obesity (BMI ≥ 35 kg/m²)^{7,8}



Employees with obesity incur a more than **2.5X increase in cost** vs employees with normal weight^{8,a}



Absence due to illness or injury is **increased 128%** for employees with obesity: **3 additional days** per year⁹

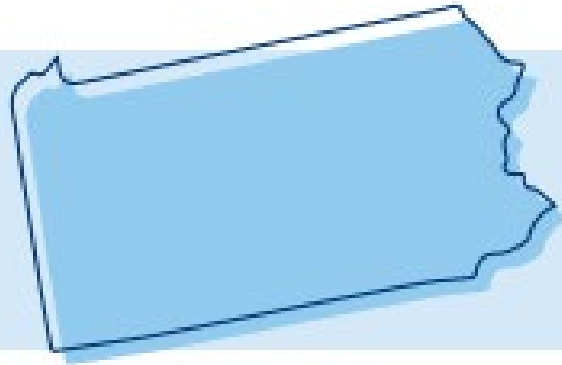
\$271 to \$542 Annual productivity loss per employee with obesity⁹

\$14,341 to \$28,321 Cost per employee with obesity per year^{8,b}

BMI=body mass index.

^aIncludes medical, pharmacy, sick days, disability, presenteeism, and workers' compensation costs. Cost increase depends on class (severity) of obesity.

^bRange is based on class (severity) of obesity.



The State of Obesity in Pennsylvania

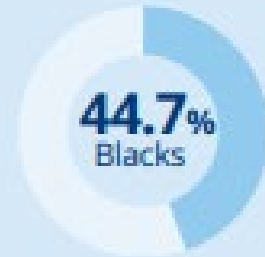


3,376,328

Adults living with obesity^{1,2}

33.2%

Percentage of adults with obesity²



Obesity is associated with more than 60 comorbidities³



10.8%

Adult diabetes rate⁴



33.3%

Adult hypertension rate⁵



33.6%

Adult high cholesterol rate⁶

What impact does obesity have on employers?

Healthcare costs are high



Obesity is associated with a **46% increase** in inpatient costs, a **27% increase** in non-inpatient costs, and an **80% increase** in prescription medication costs vs normal weight¹

Lost productivity costs are concerning



Obesity accounts for **per-employee** additional annual sick leave and short-term disability cost of **\$1,002** and **\$205** among workers in the US²

The future workforce is at risk



Over **one fifth (20.6%)** of 12- to 19-year-olds in the US have obesity³



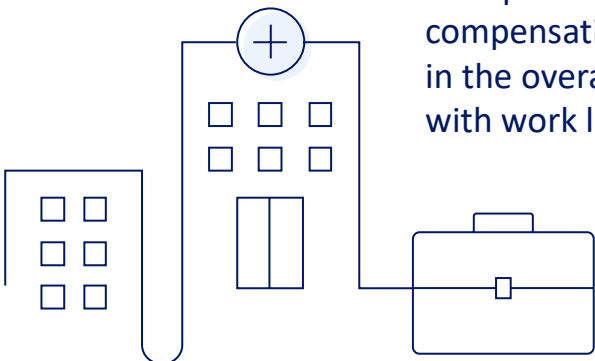
It is not getting better: the World Health Organization has declared obesity an **epidemic**⁴

References: **1.** Finkelstein et al. Annual medical spending attributable to obesity: payer- and service-specific estimates. Health Affairs. 2009. **2.** Kleinman et al. Cohort analysis assessing medical and nonmedical cost associated with obesity in the workplace. J Occup Environ Med. 2014 Feb;56(2):161-70. **3.** Centers for Disease Control. Prevalence of obesity among adults and youth: United States, 2015-2016. NCHS Data Brief 288, October 2017. Available at: <https://www.cdc.gov/nchs/data/databriefs/db288.pdf>. **4.** World Health Organization. Obesity: preventing and managing the global epidemic. Available at: https://www.who.int/nutrition/publications/obesity/WHO_TRS_894/en/.

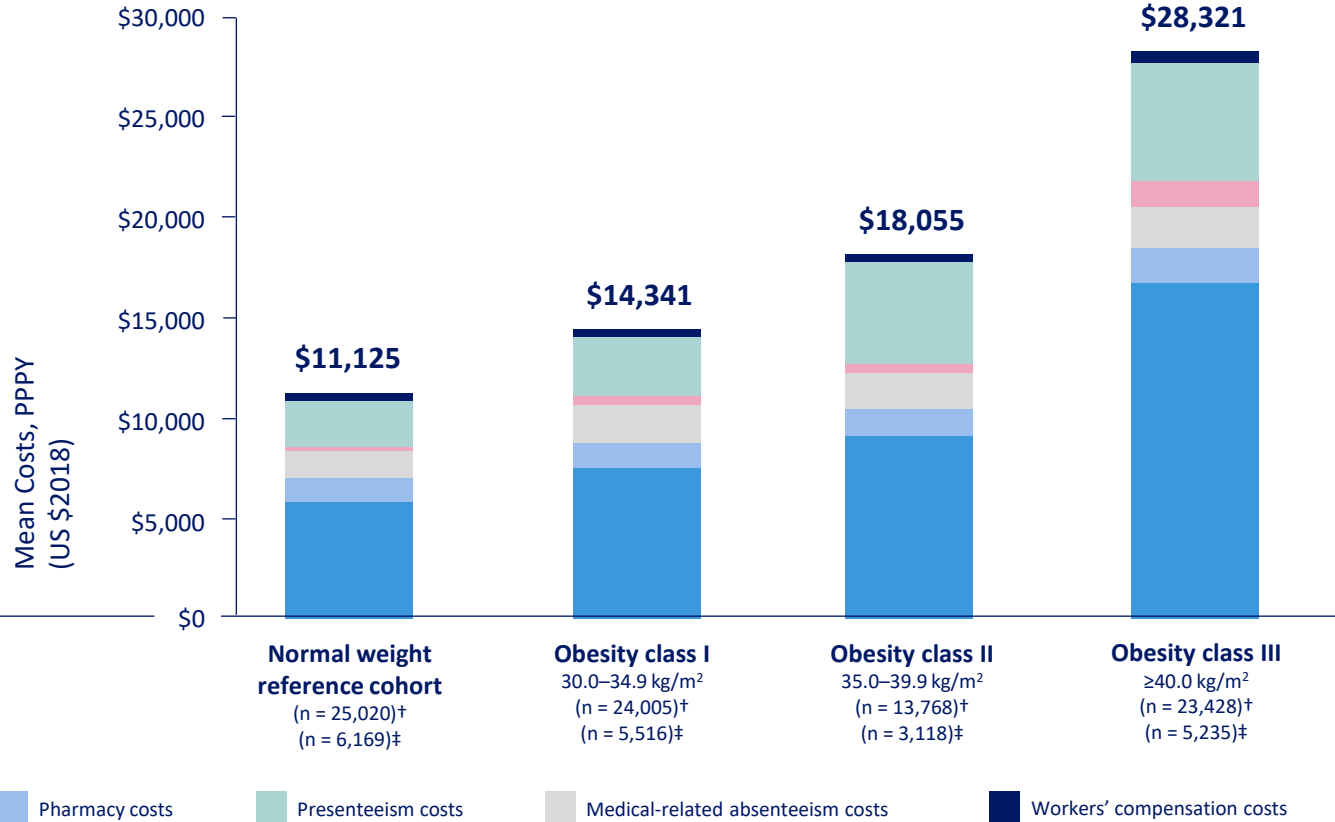
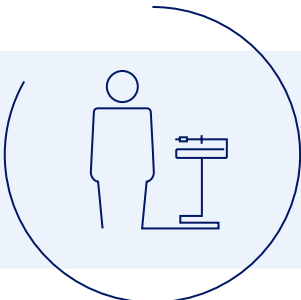


Obesity increases direct (medical and pharmacy) costs and indirect costs associated with work loss vs normal weight, with increasing BMI resulting in increased costs

Adjusted direct and indirect healthcare costs (including extrapolated presenteeism and workers' compensation costs) in the overall population and employees with work loss coverage¹



Data from a US employer claims database (2010–2017), which includes administrative claims for >19.1 million privately-insured individuals by 84 self-insured Fortune 500 companies



[†]Total sample size for direct costs (medical and pharmacy). [‡]Sample size for indirect costs (medical-related absenteeism, disability, presenteeism, and workers' compensation), representing the number of employees with work loss coverage.

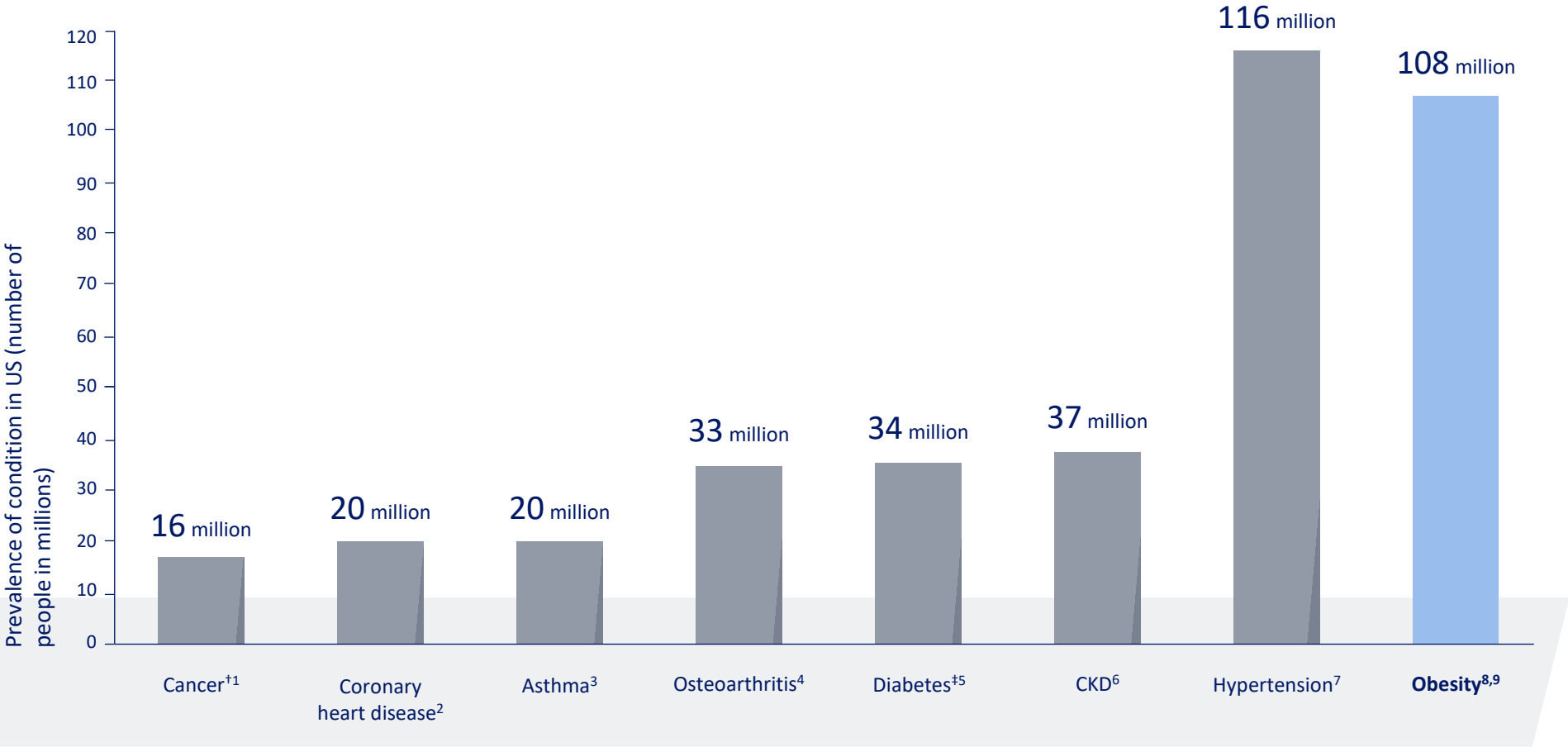
Abbreviations: BMI, body mass index; PPPY, per-patient-per-year.

Reference: 1. Ramasamy et al. Direct and Indirect Cost of Obesity Among the Privately Insured in the United States A Focus on the Impact by Type of Industry J Occup Environ Med. 2019; 61(11):877-886.



Obesity is more common than most other chronic conditions in the US

Obesity affects >40% of the adult population in the US, is more prevalent than many other major common chronic diseases and almost as prevalent as hypertension¹⁻⁸

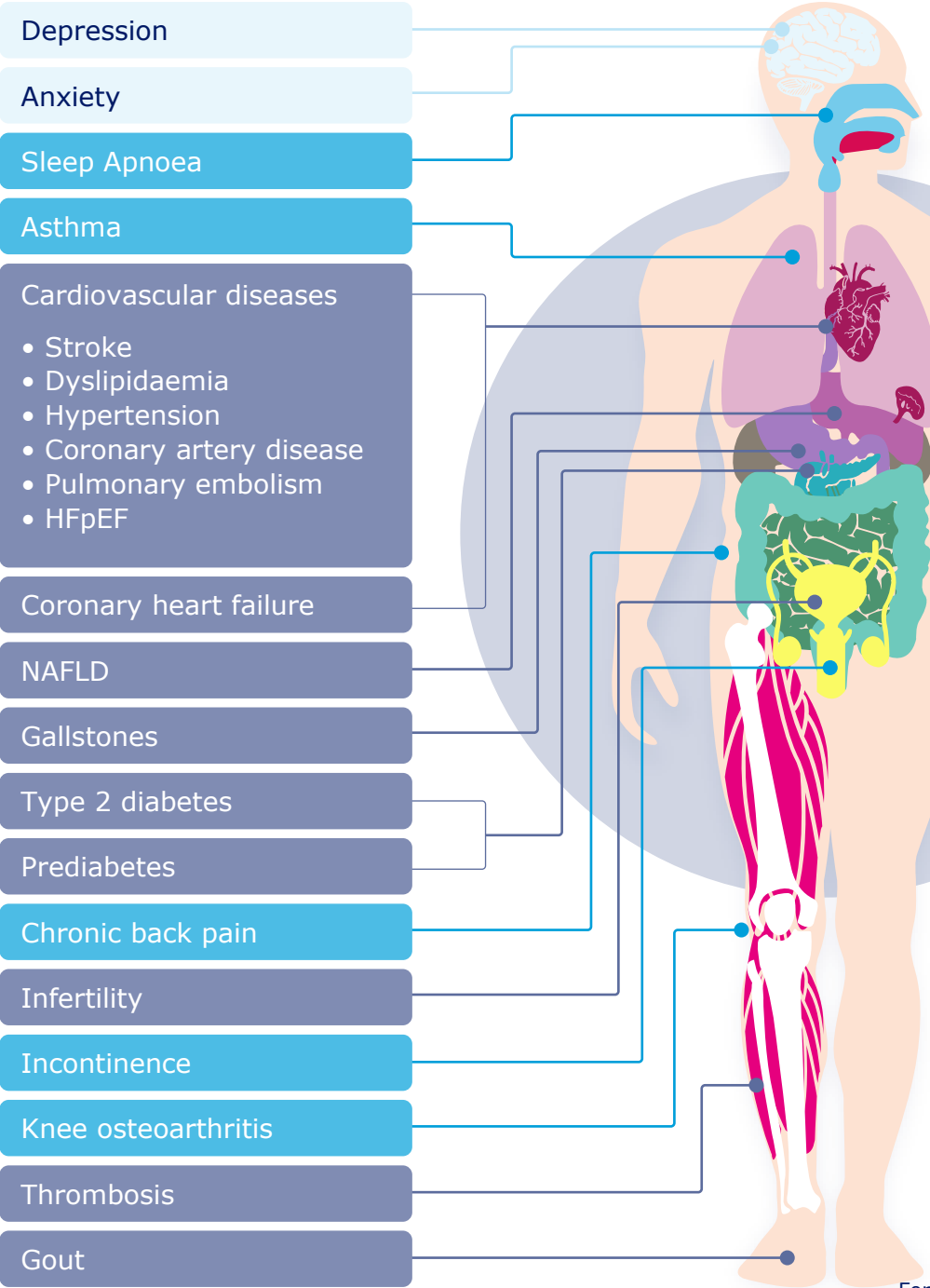


[†]Cancer of any site. [‡]Prevalence includes undiagnosed cases.

Abbreviations: CKD, chronic kidney disease; T2D, type 2 diabetes.

References: 1. NIH National Cancer Institute. Cancer Stat Facts: Cancer of Any Site. Available at: <https://seer.cancer.gov/statfacts/html/all.html>. 2. Virani et al. AHA Statistical Update: Heart disease and stroke statistics -2021 update. Circulation. 2021;143:e254-e743. 3. CDC. Most Recent National Asthma Data. Available at: <https://www.cdc.gov/asthma/most-recent-national-asthma-data.htm>. 4. CDC. Osteoarthritis. Available at: <https://www.cdc.gov/arthritis/basics/osteoarthritis.htm>. 5. CDC. National Diabetes Statistics Report 2020. Available at: <https://www.cdc.gov/diabetes/pdfs/data/statistics/national-diabetes-statistics-report.pdf>. 6. CDC. Chronic Kidney Disease in the United States, 2021. Available at: <https://www.cdc.gov/kidneydisease/publications-resources/ckd-national-facts.html>. 7. CDC. Facts About Hypertension. Available at: <https://www.cdc.gov/bloodpressure/facts.htm>. 8. Hales et al. Prevalence of Obesity and Severe Obesity Among Adults: United States, 2017–2018. NCHS Data Brief, no 360. 9. US Census Bureau. Estimates of the Total Resident Population and Resident Population Age 18 Years and Older for the United States, States, and Puerto Rico: July 1, 2019 (SCPRC-EST2019-18+POP-RES)".





Obesity is associated with multiple complications¹⁻⁷

- Cancers – including:
- breast
 - colorectal
 - endometrial
 - esophageal
 - kidney
 - ovarian
 - pancreatic
 - prostate
- Physical functioning

- MENTAL
- MECHANICAL
- METABOLIC

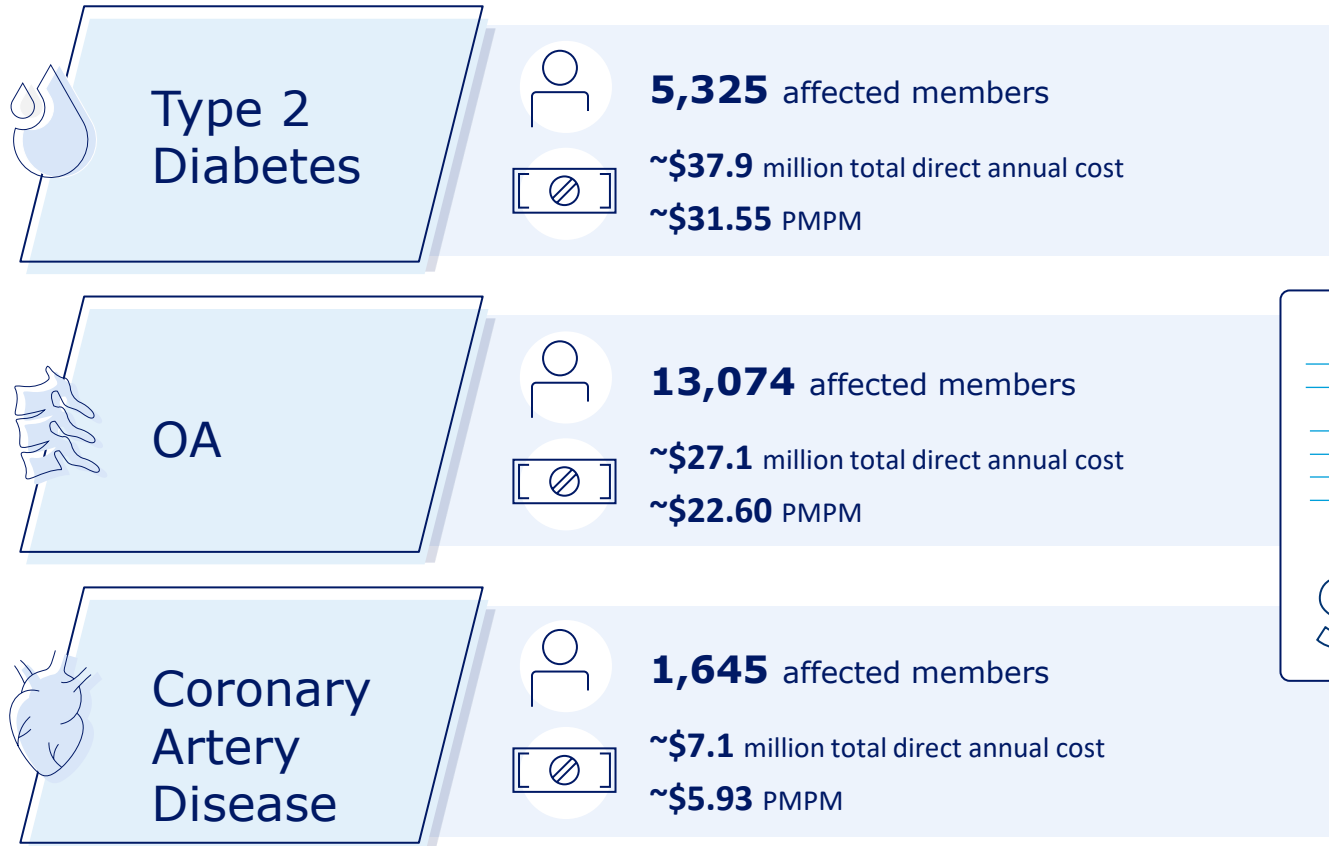
Abbreviations: HFpEF, heart failure with preserved ejection fraction; NAFLD, non-alcoholic fatty liver disease.

References: **1.** Sharma AM. M, M, M & M: A mnemonic for assessing obesity. *Obes Rev* 2010;11:808–9. **2.** Guh DP et al. The incidence of co-morbidities related to obesity and overweight: A systematic review and meta-analysis. *BMC Public Health* 2009;9:88. **3.** Luppino FS et al. Overweight, obesity, and depression: A systematic review and meta-analysis of longitudinal studies. *Arch Gen Psychiatry* 2010;67(3):220–9. **4.** Simon GE et al. Association between obesity and psychiatric disorders in the US adult population. *Arch Gen Psychiatry* 2006;63(7):824–30. **5.** Church et al. Association of cardiorespiratory fitness, body mass index, and waist circumference to non-alcoholic fatty liver disease. *Gastroenterology* 2006;130(7):2023–30. **6.** Li C et al. Prevalence of self-reported clinically diagnosed sleep apnea according to obesity status in men and women: National health and nutrition examination survey, 2005–2006. *Prev Med* 2010;51(1):18–23. **7.** Hosler AS. Prevalence of self-reported prediabetes among adults participating in a community-based health awareness program, New York state. *Prev Chronic Dis* 2009;6(2):A48.



The complications of obesity impose substantial direct medical costs on health plans

Direct medical costs of obesity-related complications in a hypothetical health plan of 100,000 members^{1,2,†}



The impact of obesity-related comorbidities can be seen in your medical and pharmacy costs

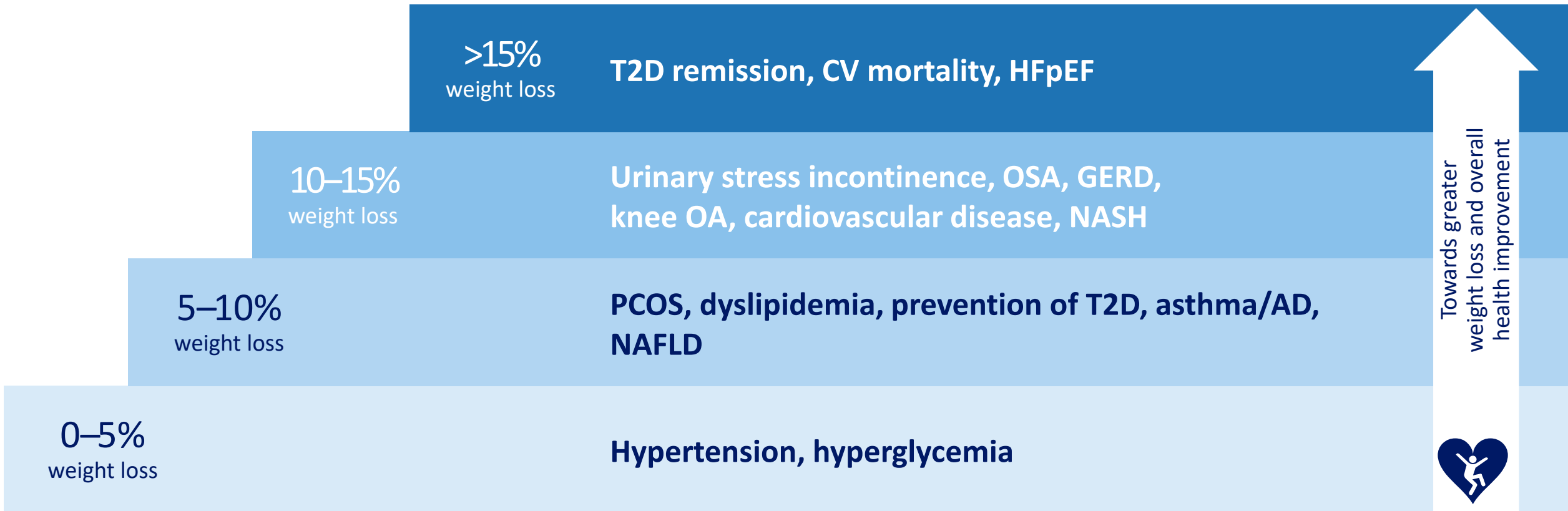


PMPM=per-member per-month.

†Costs shown are direct medical costs associated with treating specific overweight- and obesity-related comorbidities PMPM in 2016.

References: 1. Waters H, Graf M. <https://milkeninstitute.org/sites/default/files/reports-pdf/MI-Americas-Obesity-Crisis-WEB.pdf>. Published October 2018. Accessed October 6, 2020. 2. United States Census Bureau. https://www2.census.gov/programs-surveys/demo/tables/age-and-sex/2016/age-sex-composition/2016gender_table1.xls. Accessed November 4, 2020.

Effect of weight loss on health outcomes



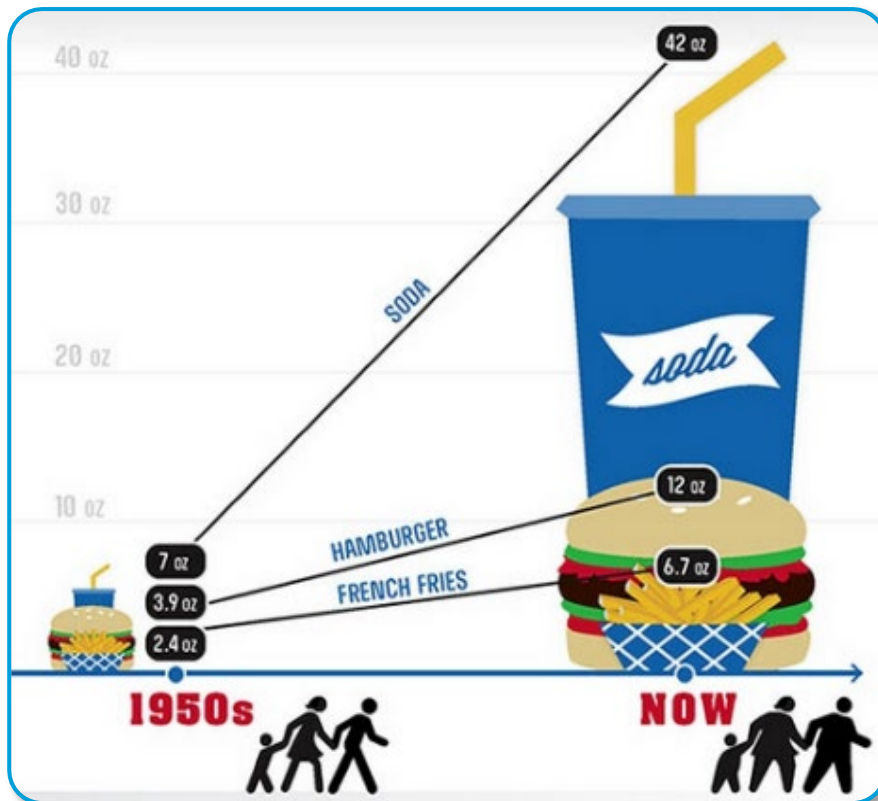
Abbreviations: AD, airway disease; CV, cardiovascular; GERD, gastroesophageal reflux disease; HFpEF, heart failure with preserved ejection fraction; NAFLD, non-alcoholic fatty liver disease; NASH, non-alcoholic steatohepatitis; OA, osteoarthritis; OSA, obstructive sleep apnea; PCOS, polycystic ovary syndrome; TG, triglycerides.

References: Garvey WT et al. *Endocr Pract.* 2016; 22(Suppl. 3): 1–203; Look AHEAD Research Group. *Lancet Diabetes Endocrinol.* 2016; 4(11): 913–21; Lean ME et al. *Lancet.* 2018; 391(10120): 541–51; Benraoune F and Litwin SE. *Curr Opin Cardiol.* 2011; 26(6): 555–61; Sundström J et al. *Circulation.* 2017; 135(17): 1577–85.



What may explain high obesity rates in the US today?

Dietary changes
(such as increased portion sizes)



Other contributing factors

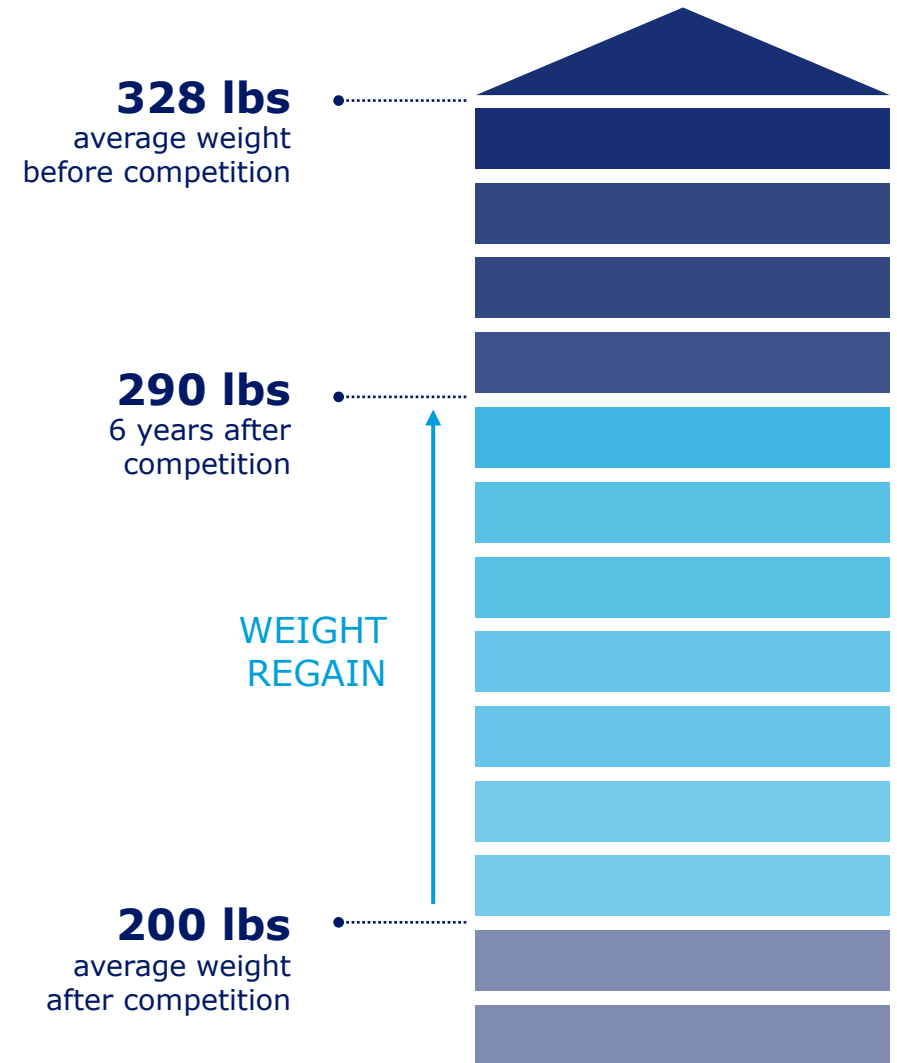


Weight loss is often not sustained in the long term

During the Biggest Loser competition, contestants lost collectively on average 128 pounds. What was the average weight 6 years later?



6 years after **The Biggest Loser** competition in the US, most contestants experienced **weight regain**¹



References: 1. Fothergill et al. Persistent metabolic adaptation 6 years after the Biggest Loser competition. Obesity (Silver Spring). 2016;24(8):1612-1619.

What we know about obesity: it's not like it used to be¹

Historical view of obesity²

Energy imbalance led by
poor patient choices...



FOOD



LIFESTYLE



PHYSICAL ACTIVITY

Modern view of obesity^{2,3}



**Brain chemistry and biology
determine eating behaviors**



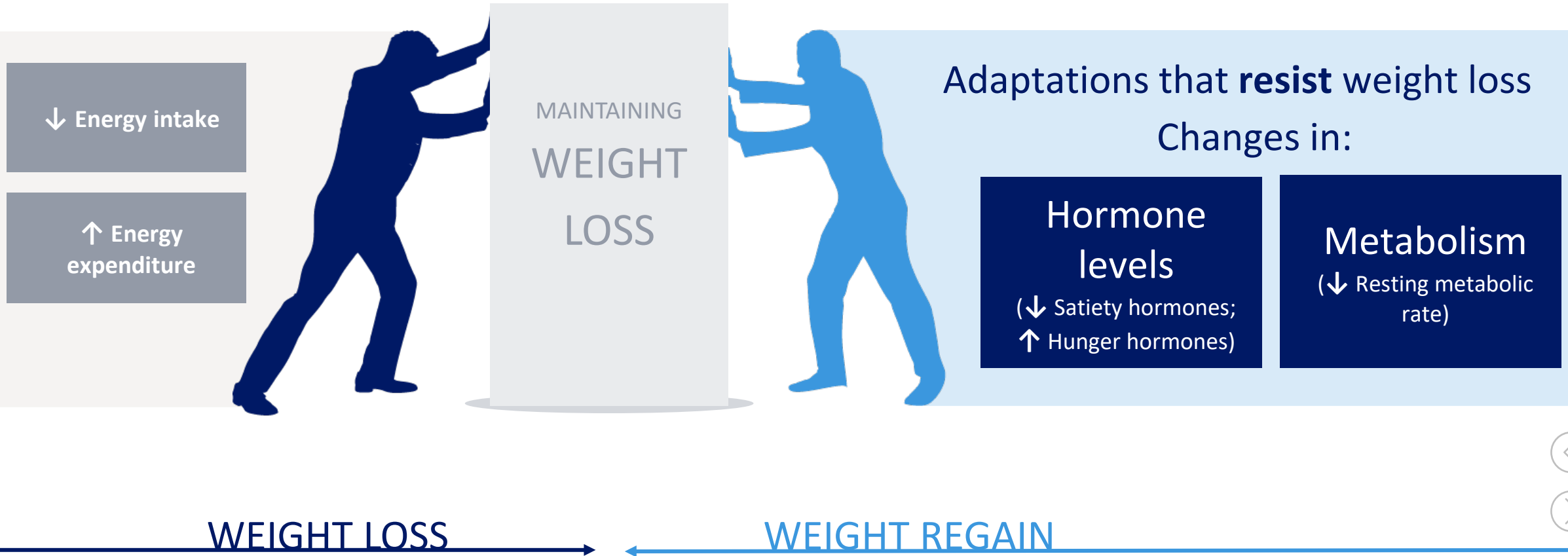
**Not all calories are alike;
the type and nature are crucial**



**Physiological factors drive weight
regain after weight loss through
dieting**

- **References:** **1.** Obesity Action Center. Take the pledge to speak out and challenge perceptions of obesity. Available at: <https://www.obesityaction.org/action-center/challenge-perceptions-of-obesity-pledge/>. **2.** Schwartz et al. Obesity Pathogenesis: An Endocrine Society Scientific Statement. Endocrine Reviews 2017;38(4):267-296. **3.** Sumithran et al. Long-term persistence of hormonal adaptations to weight loss. N Engl J Med. 2011 Oct 27;365(17):1597-604

Metabolic adaptations resist weight loss



References: 1. Fothergill E et al. *Obesity (Silver Spring)*. 2016; 24(8): 1612–19; 2. Sumithran P et al. *N Engl J Med*. 2011; 365(17): 1597–604.

The brain defends a 'set-point' for body weight and level of adipose tissue, making sustained weight loss difficult¹

Set-point:
Adaptations that resist weight loss



Changes in

Hormone levels (↓ satiety hormones; ↑ hunger hormones)
Metabolism (↓ energy expenditure)

References: 1. Farias et al. Set-point theory and obesity. Metab Syndr Relat Disord 2011;9:85-9.

Weight Bias

Weight bias ranks just below race, gender, and age as the fourth most common form of discrimination in the US

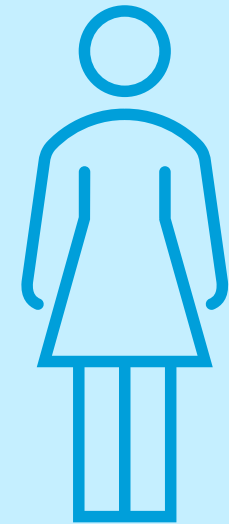
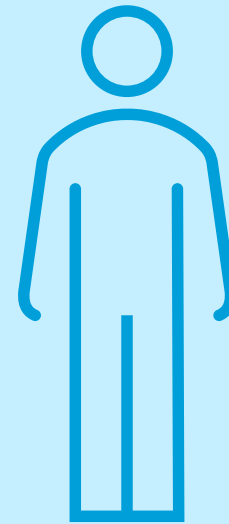
31%

of weight IAT respondents had strong automatic preference for people **without** obesity*

5%
of men

and

10%
of women

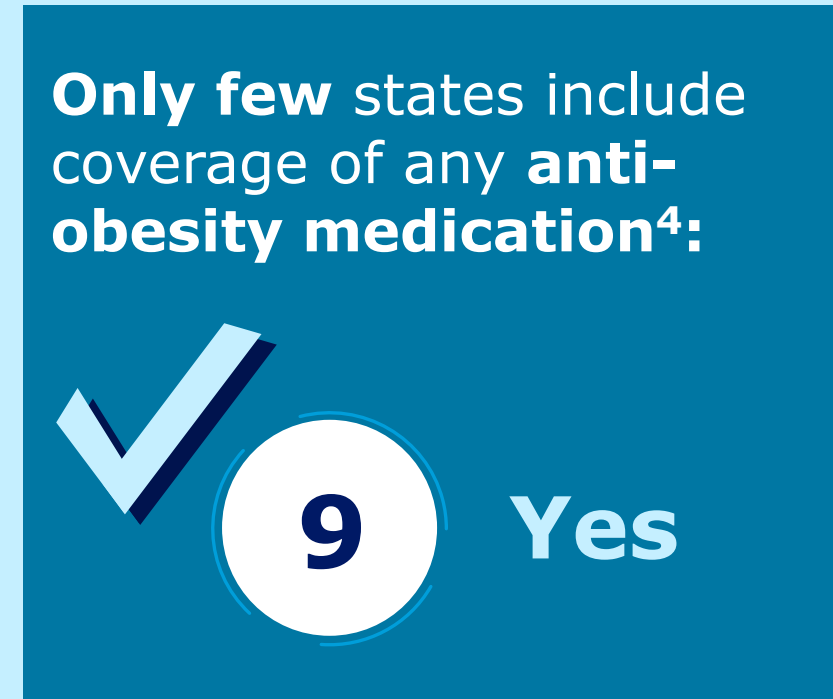
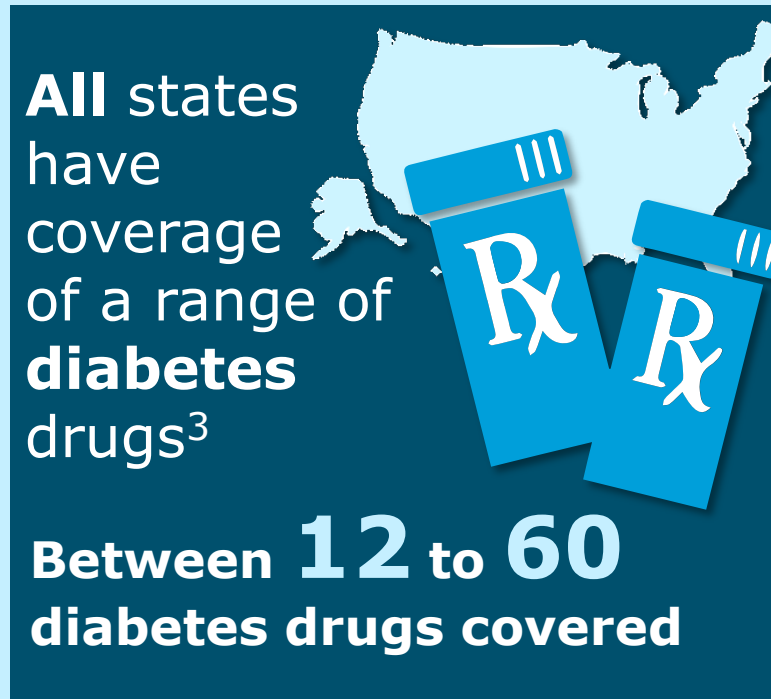
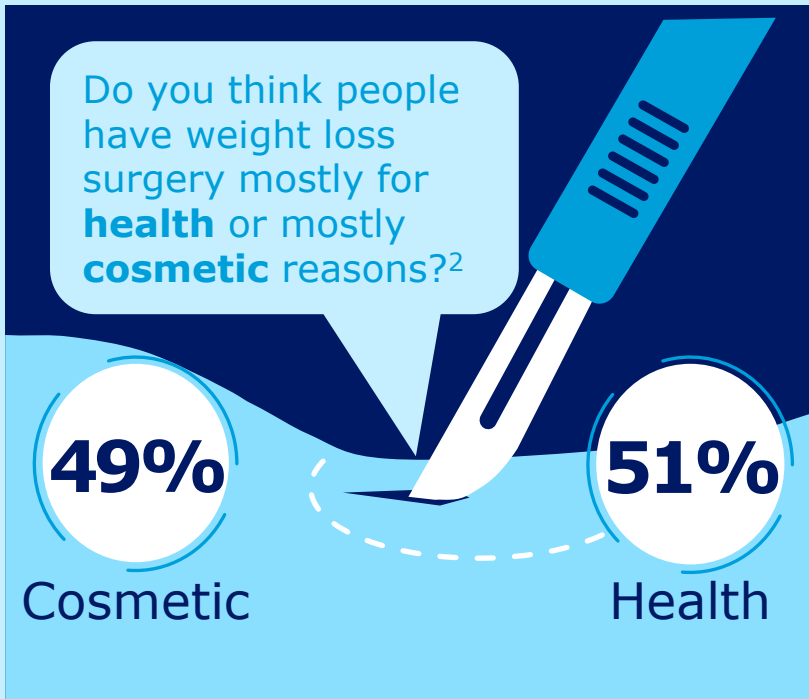


Reported **daily or lifetime** discrimination due to weight

1. Puhl R et al. *Int J Obes* 2008;32:992-1000.

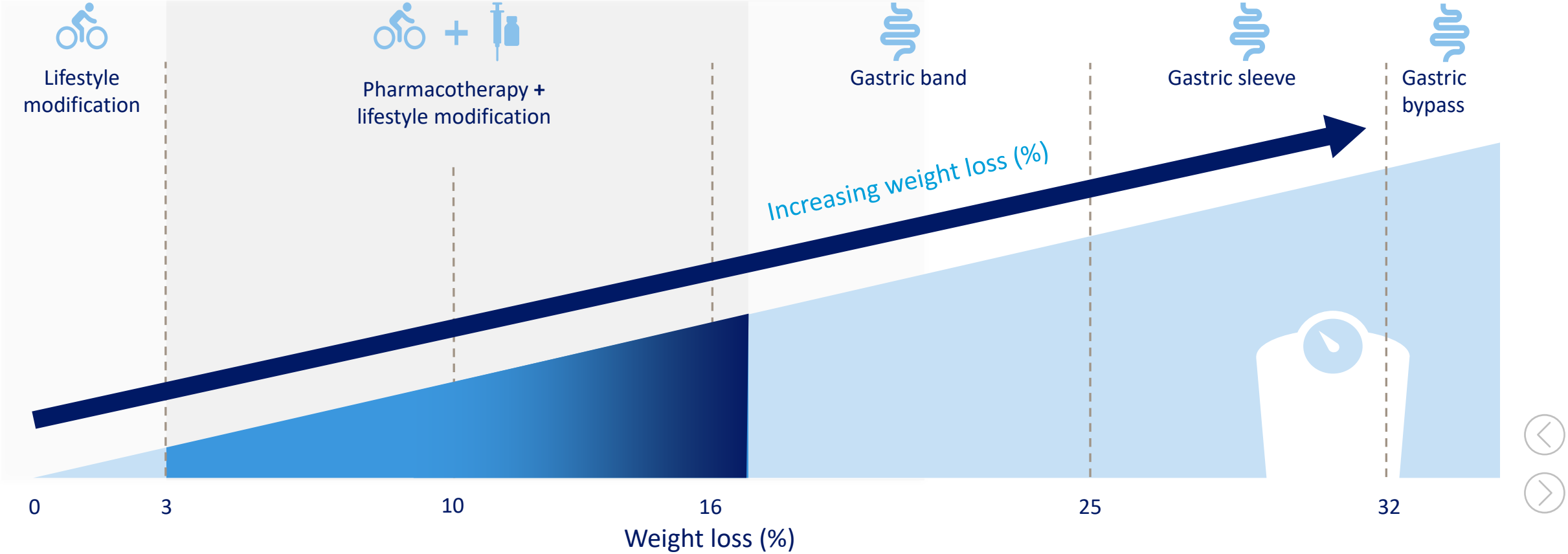
Weight bias can impact coverage

The assumption that body weight is entirely controllable by lifestyle choices may affect coverage for obesity treatment¹



1. Rubino F et al. *Nat Med* 2020;26:485–497; 2. Dolan P et al. *JAMA Surg* 2019;154:264–266;
3. Diabetes Pharmaceuticals State Mandates. National Conference of State Legislatures (NCSL). 2016.
<https://www.ncsl.org/research/health/diabetes-pharmaceuticals-state-mandates.aspx>. Accessed May 2020;
4. Gomez G & Stanford FC. *Int J Obes (Lond)* 2018;42:495–500.

Weight loss with currently available pharmacotherapy



References: Novo Nordisk. Available from <https://www.novonordisk.com/content/nncorp/global/en/news-and-media/news-and-ir-materials/news-details.html?id=280>; <https://www.novonordisk.com/content/nncorp/global/en/news-and-media/news-and-ir-materials/news-details.html?id=278>; <https://www.novonordisk.com/content/nncorp/global/en/news-and-media/news-and-ir-materials/news-details.html?id=286>. Accessed September 2020; Wadden TA et al. Presented at the 38th Annual Meeting of The Obesity Society (TOS) held at ObesityWeek®, November 2–6, 2020 [Oral 084].



Clinical guidelines recommend increasing treatment intensity in line with disease stage

AHA/ACC/TOS guidelines

Treatment	BMI category (kg/m ²)				
	≥25	≥27	≥30	≥35	≥40
Diet, physical activity and behavior therapy	With comorbidities	With comorbidities	+	+	+
Pharmacotherapy		With comorbidities	+	+	+
Surgery				With comorbidities	+

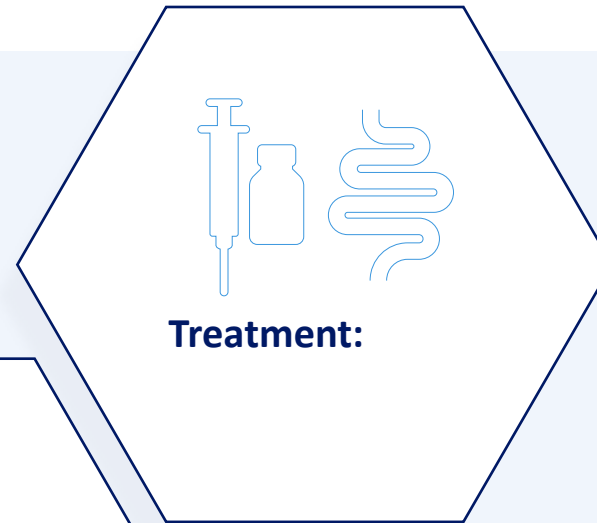
What can employers do to support weight management?



- Assess employee needs and interest around workplace wellness programs¹
- Assess intervention points available (e.g. expanding insurance coverage, changes to food offered in workplace environment)¹



- Promote of physical activity (e.g. through gym vouchers)¹
- Support employees with stress management¹



- Provide tiered healthcare plans that cover the full range of obesity treatment options based on severity:¹
 - Behavioral counseling
 - AOMs
 - Bariatric surgery

Abbreviations: AOM, anti-obesity medication.

References: 1. Milken Institute. Obesity in the Workplace: What Employers Can Do Differently. Available at: <https://milkeninstitute.org/sites/default/files/reports-pdf/Obesity%20in%20the%20Workplace-FINAL.pdf>. 2020.