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More than two-thirds of individuals in the United States have **overweight<sup>a</sup> or obesity<sup>1,2,b</sup>**



In the United States, **~72%** of adults aged **≥20 years** have **overweight or obesity<sup>1</sup>**



**~40%** of these individuals are affected by **obesity<sup>1</sup>**



**~100 million**  
US adults have obesity<sup>1,2,c</sup>

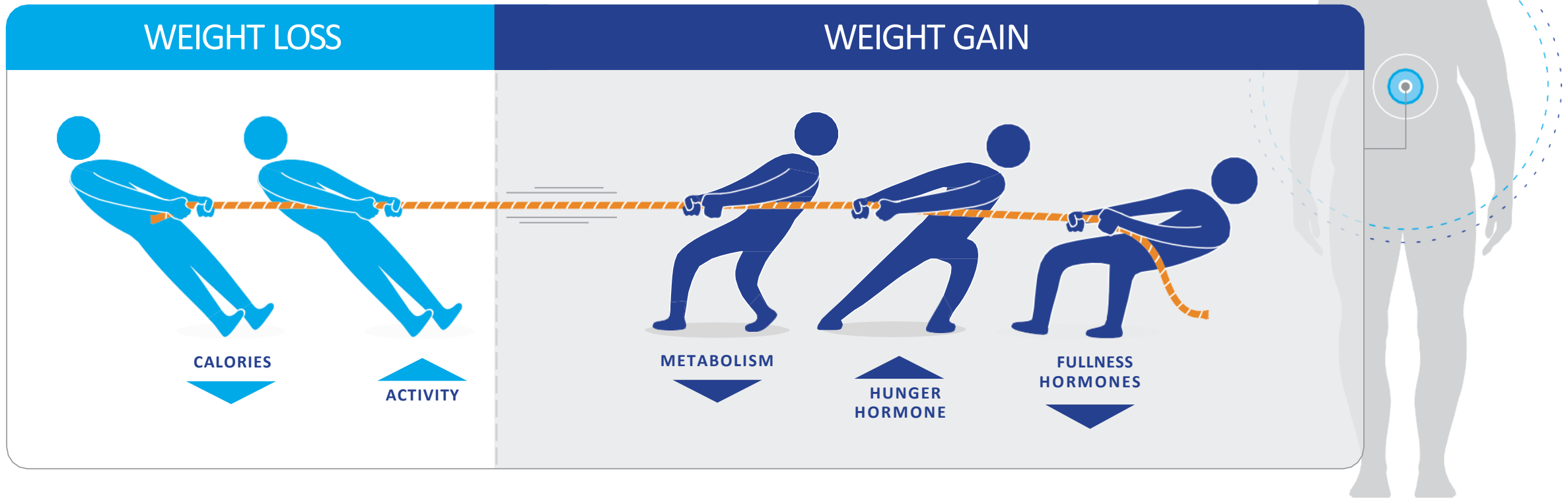
<sup>a</sup>Overweight defined as having a BMI  $\geq 25$  kg/m<sup>2</sup>. <sup>b</sup>Obesity defined as having a BMI  $\geq 30$  kg/m<sup>2</sup>. <sup>c</sup>Adults aged  $\geq 20$  years.

References: 1. Centers for Disease Control and Prevention. <http://www.cdc.gov/nchs/fastats/obesity-overweight.htm>. Last updated May 3, 2017. Accessed November 20, 2018. 2. US Census Bureau. <https://www.census.gov/quickfacts/fact/table/US#viewtop>. Accessed November 20, 2018.

# The tug-of-war of weight management

The forces of weight loss vs weight gain

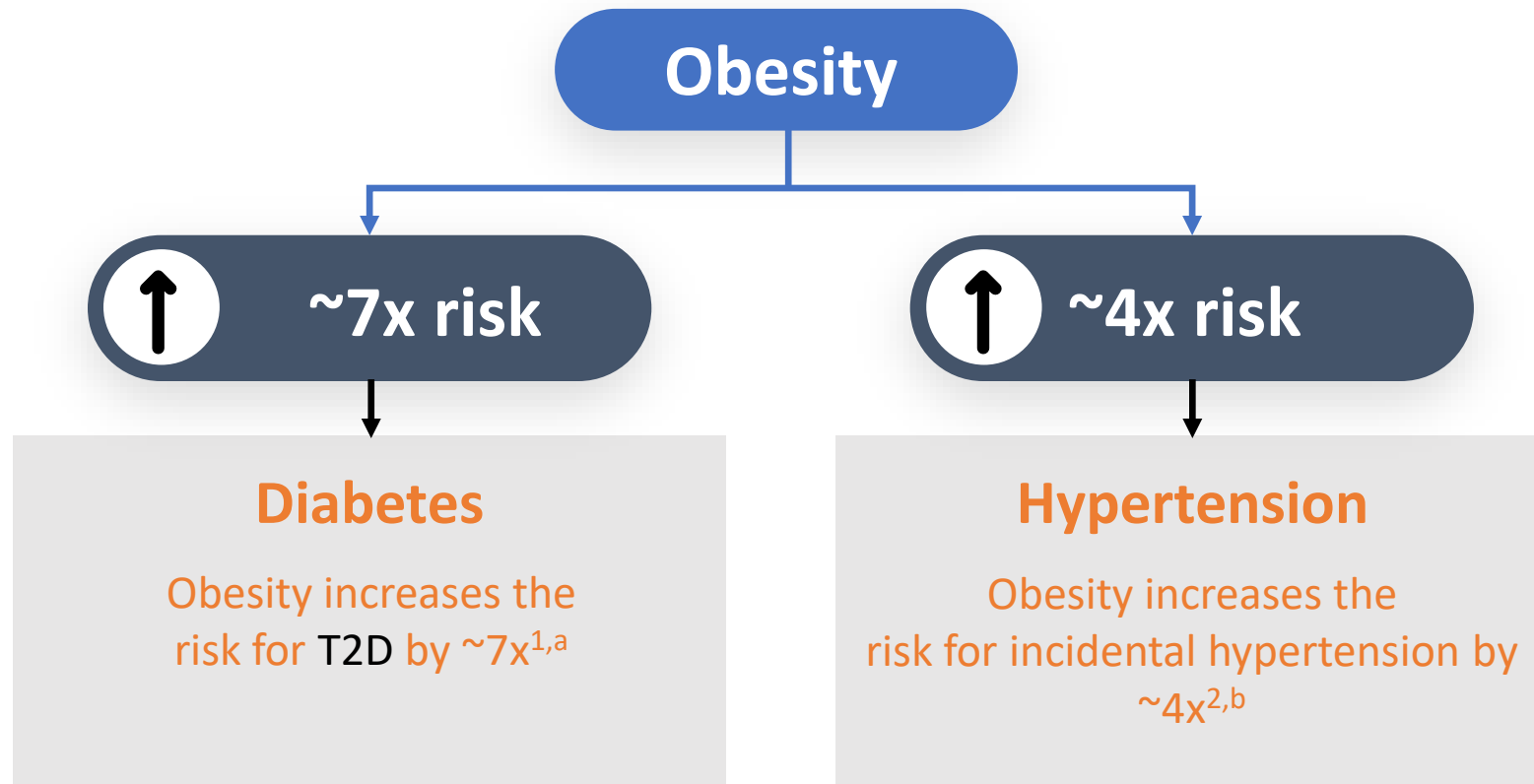
Metabolic<sup>1</sup> and hormonal responses<sup>2</sup> affect ability to maintain weight loss



Patients were randomized to calorie restriction (CR), calorie restriction with exercise (CREX), or low-calorie diet (LCD) groups. Mean percentage weight change (SEM) at 6 months by group was -10.4 (0.9)% (CR), -10.0 (0.8)% (CREX), and -13.9 (0.7)% (LCD) of initial body weight.

References: 1. Lam YY, Ravussin E. *Mol Metab.* 2016;5(11):1057-1071. 2. Sumithran P et al. *N Engl J Med.* 2011;365(17):1597-1604.

# Obesity increases the risk of weight-related comorbidities



BMI, body mass index; T2D, type 2 diabetes.

<sup>a</sup>Data from a meta-analysis of 18 studies across America (8 studies), Asia-Pacific (5 studies) and Europe (5 studies) were included in this meta-analysis, and a total of 590,251 participants aged 18-80 years were followed from 2 to 27 years (for a median of 9 years). <sup>b</sup>Data from 1132 men enrolled in The Johns Hopkins Precursors Study beginning in 1947 and were followed for a median of 46 years.

References: 1. Abdullah A et al. Diabetes Res Clin Pract. 2010;89:309–319. 2. Shihab HM et al. Circulation. 2012;126:2983–2989.

# The role of obesity in the COVID-19 pandemic cannot be ignored<sup>1-3</sup>

The systemic effects of obesity may put patients with COVID-19 at an even greater risk<sup>1,4-6</sup>



## Compromised lung function

People with obesity are more likely to have health conditions that affect breathing<sup>4-6</sup>



## Inflammation

Obesity is associated with chronic, low-grade inflammation, which may alter immune response and affect the lung tissues and airways<sup>5</sup>



## Other comorbid conditions

Obesity is associated with an increased risk of cardiovascular disease, diabetes, and kidney disease, which increase a patient's susceptibility to developing pneumonia-associated organ failure<sup>4</sup>

Data shows that even adults with a BMI of 30-35 kg/m<sup>2</sup> may face worse outcomes from COVID-19<sup>2,a</sup>

**~5x**

more likely to experience ICU admission compared with those without obesity<sup>2</sup>

**~2x**

more likely to experience respiratory failure compared with those without obesity<sup>2</sup>

The Centers for Disease Control and Prevention (CDC) states that people of any age with certain underlying medical conditions such as obesity (BMI  $\geq 30$  kg/m<sup>2</sup>) are at increased risk for severe illness from COVID-19<sup>1</sup>

<sup>a</sup>A retrospective, single-center study analyzed data from 482 consecutive patients with a confirmed diagnosis of COVID-19, hospitalized at Sant'Orsola Hospital in Bologna, Italy, between March 1 and April 20, 2020.

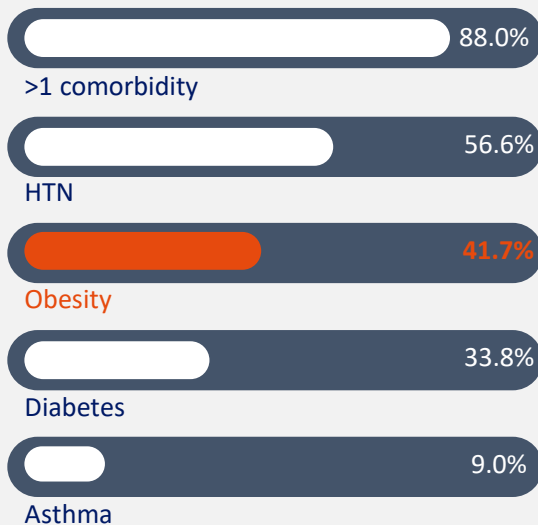
**References:** 1. Coronavirus Disease 2019 (COVID-19): People with certain medical conditions. The Centers for Disease Control and Prevention website. Updated September 11, 2020. Accessed September 18, 2020. <https://www.cdc.gov/coronavirus/2019-ncov/need-extra-precautions/people-with-medical-conditions.html>. 2. Rottoli M, Bernante P, Belvedere A, et al. How important is obesity as a risk factor for respiratory failure, intensive care admission and death in hospitalised COVID-19 patients? Results from a single Italian centre. *Eur J Endocrinol.* 2020;183(4):389-397. 3. COVID-19 laboratory-confirmed hospitalizations. The Centers for Disease Control and Prevention website. Accessed September 18, 2020. [https://gis.cdc.gov/grasp/COVIDNet/COVID19\\_5.html](https://gis.cdc.gov/grasp/COVIDNet/COVID19_5.html). 4. Stefan N, Birkenfeld AL, Schulze MB, Ludwig DS. Obesity and impaired metabolic health in patients with COVID-19. *Nat Rev Endocrinol.* 2020;16(7):341-342. 5. Masa JF, Pepin J, Borel J, et al. Obesity hypoventilation syndrome. *Eur Respir Rev.* 2019;28:180097. 6. Simonnet A, Chetboun M, Poissy J, et al. High prevalence of obesity in severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) requiring invasive mechanical ventilation. *Obesity (Silver Spring).* 2020;28(7):1195-1199. 7. Coronavirus (COVID-19) & obesity. The World Obesity Federation website. Accessed September 18, 2020. <https://www.worldobesity.org/news/statement-coronavirus-covid-19-obesity>.

# Obesity is a prevalent disease in patients with severe cases of COVID-19

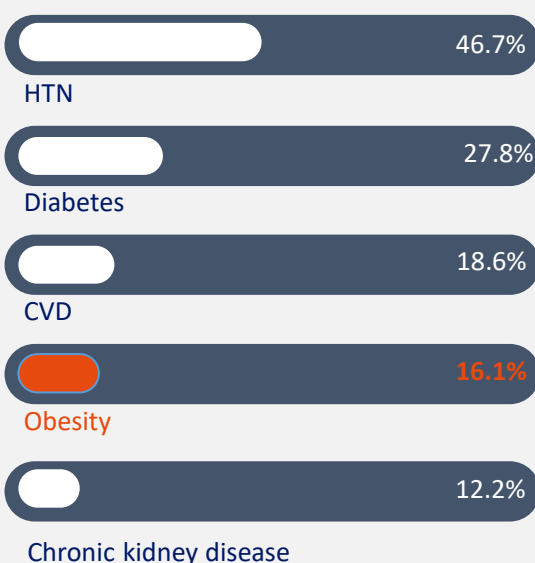
March 2020

September 2020

In a case series of 5700 patients hospitalized with COVID-19 in the New York City area from March 1–April 4<sup>1</sup>:



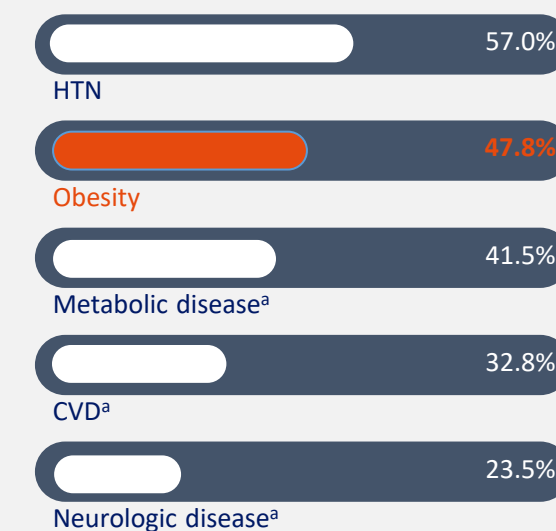
Among a cohort of 11,721 adults with COVID-19 hospitalizations across the US, February 15–April 20<sup>2</sup>:



Among 350 adult inpatients and outpatients who tested positive for COVID-19 and were interviewed between April 15–May 24 across 9 states<sup>3</sup>:



Among 12,151 hospitalized adults with information on underlying medical conditions and identified through the COVID-NET, as of September 19<sup>4</sup>:



CAD, coronary artery disease; CKD, chronic kidney disease; CVD, cardiovascular disease; DM, diabetes mellitus; HTN, hypertension; MS, multiple sclerosis.

<sup>a</sup>Metabolic disease includes DM, adrenal disorders, and thyroid dysfunction. CVD includes coronary artery disease, cardiac valve disorder, arrhythmias, congestive heart failure, and pulmonary hypertension; this category excludes people who have hypertension only. Neurologic disease includes seizure disorders, cerebral palsy, cognitive dysfunction, MS, and muscular dystrophy.

References: 1. Richardson S et al. JAMA. 2020;323:2052–2059. 2. Fried MW et al. Clin Infect Dis. 2020 Aug 28;ciaa1268. 3. Tenforde MW et al. MMWR Morb Mortal Wkly Rep. 2020;69:841–846. 4. Centers for Disease Control and Prevention. COVIDView Week 38. Available at <https://www.cdc.gov/coronavirus/2019-ncov/covid-data/pdf/covidview-09-25-2020.pdf>. Accessed on September 28, 2020.