

# Obesity and COVID-19

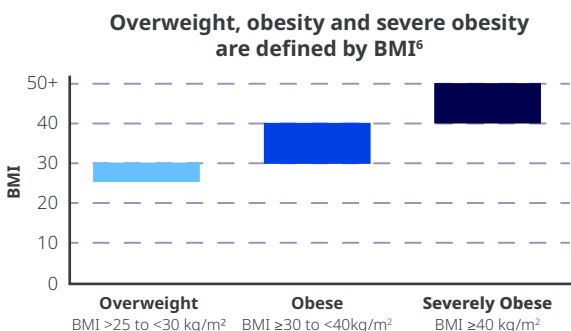


## How are the terms *overweight*, *obesity* and *severe obesity* defined?

**Overweight** and **obesity** are conditions in which a person has excess body weight / fat in comparison to their height, which can cause serious health problems.<sup>1–5</sup>



Increasing **BMI** increases risk of **severe illness due to COVID-19**.<sup>6,7</sup>



## How prevalent is obesity among the United States' adult population?

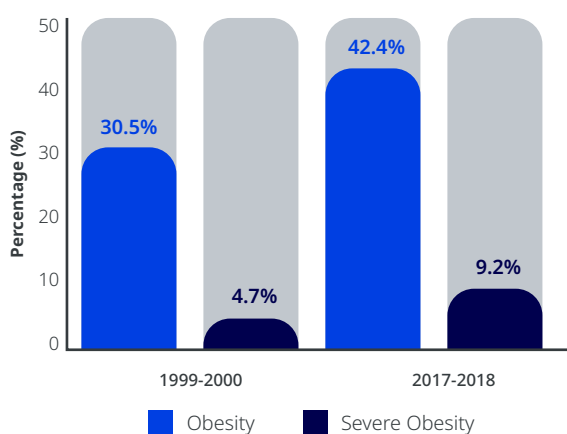
Prevalence of **obesity** and **severe obesity** has **increased over time** in all age groups in the US, regardless of socioeconomic status or ethnicity.<sup>8,9</sup>



Obesity is a **chronic disease** that is considered a **global epidemic**, owing to its increasing prevalence.<sup>8</sup>

In 2021, in 41 states, Puerto Rico, the US Virgin Islands, and Guam, **at least 30% of the adult populations met criteria for obesity**.<sup>9</sup>

From 1999–2000 through 2017–2018, the age-adjusted prevalence of **obesity** and **severe obesity** increased among adults ≥ 20 years of age.<sup>10</sup>



## What is the interaction between obesity and COVID-19?

**Obesity** and associated comorbidities can increase the risk of severe COVID-19.

### Factors associated with obesity and severe COVID-19\*

Certain cancer types<sup>6,11</sup>

Chronic lung disease<sup>6</sup>

Diabetes<sup>6,11</sup>

Heart conditions<sup>6,11</sup>

Hypercoagulability<sup>12</sup>

Inflammation<sup>13,14</sup>

Neurological conditions<sup>6,15</sup>

Non-alcoholic fatty liver disease (NAFLD)<sup>16</sup>

Older age<sup>6</sup>

Renal disease<sup>6</sup>

Weakened immune systems<sup>4,6</sup>

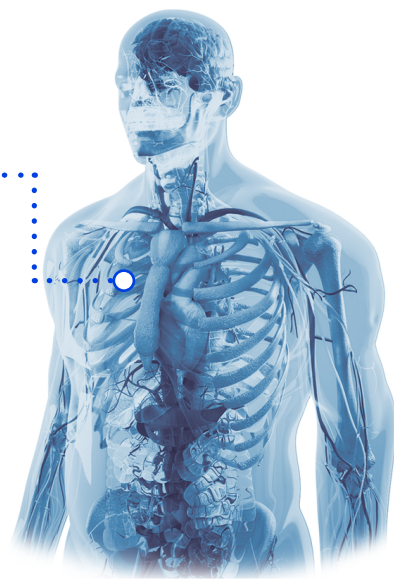
The presence of **multiple overlapping factors** may contribute to the **increased risk of severe COVID-19**.<sup>17</sup>

\*For a full and comprehensive list of risk factors associated with severe COVID-19, see reference 6.

## What are the pathophysiological impacts of severe COVID-19 on obese patients?

### Decrease in total respiratory system compliance

- **Decreased ventilatory reserve** coupled with a tendency for **respiratory failure** is challenging during SARS-CoV-2 infection.<sup>12</sup>
- **Thoracic adiposity** reduces chest wall compliance, increases airway resistance, impairs respiratory muscle efficiency and leads to ventilation-perfusion inequality.<sup>12</sup>



### Obesity-induced impaired immune response

- **Impaired adipocyte differentiation** decreases secretion of anti-inflammatory adiponectin, and increases secretion of proinflammatory mediators and cytokines, **enhancing local inflammation**.<sup>12,18</sup>

### Hypercoagulability: linking obesity and COVID-19

- Higher risk of developing **pulmonary embolism**.<sup>12</sup>



## How is obesity a risk factor for severe COVID-19 and long COVID?

**Obesity** is associated with increased risk of **persistent COVID-19 symptoms, mechanical ventilation, and in-hospital death**.<sup>19,20</sup>

The risk of hospitalization from COVID-19 is **tripled** in patients with **obesity**.<sup>4</sup>



### Risk factors for long COVID:<sup>21</sup>



Increased BMI



Comorbidities



Smoking



Ethnic minority group<sup>†</sup>



Female sex



Socioeconomic deprivation

<sup>†</sup>Black Afro-Caribbean ethnic groups, mixed ethnicity and other minority ethnic groups comprised of patients with native American, Middle Eastern, or Polynesian origin, as compared to white ethnic groups.

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