How Can Obesity Affect Your COVID-19 Coronavirus Risk? Here Are Some Possibilities

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For years, experts have been warning our society about not doing enough to prepare for an infectious disease pandemic. This year with the COVID-19 coronavirus pandemic, you've seen how that went. At the same time, for years, experts have been warning our society about not doing enough to address the continuing obesity epidemic. Yep, that's not going too well either.

This certainly is not the only connection between the COVID-19 coronavirus pandemic and obesity. In fact, recently published data suggest that obesity

may be a risk for worse outcomes from severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) infections. Isn't it fabulous when two major public health problems may be combining to make things even worse? (By the way, that's being sarcastic.) That would be more great news for the U.S., which according to the Centers for Disease Control and Prevention (CDC) has seen obesity rates go from 30.5% in 1999–2000 to 42.4% in 2017–2018. (Yep, sarcasm once again.)

Like much of the information on the COVID-19 coronavirus, info on the relationship with obesity is still quite preliminary. Just look at the non-sarcastic data from the COVID-19–Associated Hospitalization Surveillance Network (COVID-NET) published on April 17 in the CDC's Morbidity and Mortality Weekly Report (MMWR). COVID-NET tracks those patients who get admitted for laboratory-confirmed COVID-19 to a sample of hospitals from 99 counties in 14 states (California, Colorado, Connecticut, Georgia, Iowa, Maryland, Michigan, Minnesota, New Mexico, New York, Ohio, Oregon, Tennessee, and Utah). These are far from all of the COVID-19-related hospitalizations that are occurring, but are supposed to give a sampled snapshot of what's been happening. Consider it to be just a really brief trailer for the movie that's currently going on in the U.S. Like a Marvel trailer, it may represent what the movie is really like, or it may not

From March 1 to March 30, nearly half (48.3%) of the patients in COVID-NET had obesity. Notice that this number is higher than the obesity rate for the overall population, which suggests that those with obesity may be more likely to be hospitalized. It's probably a safe assumption that being hospitalized means that you have more severe COVID-19 than those who aren't. Incidentally, obesity was the most common chronic health condition among those patients who were from 18 to 64 years old.

Then there was the study published in the journal *Obesity* earlier this month. Among 124 patients admitted for COVID-19 to CHU Lille, a medical center in France, 47.6% had obesity, defined as a body mass index (BMI) of greater than 30 kg/m^2, and 28.2% had severe obesity, which was a BMI of greater than 35 kg/m^2. A majority (68.6%) of all the patients and 85.7% of those with severe obesity ended up being placed on a mechanical ventilator. In fact, patients with a BMI of greater than 35 kg/m^2 were 7.36 times more likely to have been put on a mechanical ventilator compared to those with a BMI of less than 25 kg/m^2. By the way, no one gets placed on a mechanical ventilator just for fun or just for the heck of it. Being placed on mechanical ventilator typically means that your lung function has gotten so bad that you can no longer breathe by yourself or get enough oxygen while breathing by yourself.

Again these studies aren't enough to say definitively that those with obesity at higher risk for more severe COVID-19. But if it turned out that obesity is indeed a risk factor for worse outcomes, it would be as surprising as a fight erupting on a reality television show. Scientific studies have already suggested that those with obesity tend to get more severe forms of other types of infections, as described in a publication in the *International Journal of Obesity*. For example, during the 2009 H1N1 flu epidemic, those with obesity seemed to fare worse.

Yep, that was over a decade ago, during the *last* pandemic. And here's a video from 2018 of Aubree Gordon, PhD, who is currently an Associate Professor of Epidemiology at the University of Michigan School of Public Health, explaining how her team found that those with obesity and infected with the influenza virus actually shed the virus for longer periods of time:

These findings further confirm that obesity is a darn complex disease. Anyone who tells you that obesity is simple is simply barking up the wrong mountain. And making molehills out of many, many different trees. Or something like

that. Obesity is not just like a costume that you can take off any time that you'd like. Instead, it is a disease that affects many different parts of your body in complex ways.

Take your lungs for example, not literally but figuratively. Obesity may affect and impair the functioning of your lungs and, in turn, *potentially* make them more vulnerable to not only infection but also worse infection outcomes. Based on a study published in the *Journal of Applied Physiology* and a study published in the journal *Chest*, obesity may restrict the expansion of your lungs and thus the amount of air that you can inhale. Restricting how much air you can inhale may lead to mismatches between where the air is and where the blood is flowing in your lungs as well. This could makes it even harder for your lungs to get oxygen into your blood. As you know, oxygen is pretty freaking important.

Here's a potential breath of fresh air, though. Reducing obesity could improve lung function. This is what seemed to occur for patients who underwent bariatric surgery and subsequent weight loss in a study published in *Radiology*.

The impact of obesity is definitely not restricted to restricting your lungs. For example, obesity can affect your immune system, you know your body's defense system that tries to ward off invaders. For example, it may affect how well your macrophages, those cells that are supposed to chomp up viruses, assume their identities and find and hunt down nasties that are invading. Additionally, obesity could end up disrupt the cascade of chemicals (cytokines) that are produced by and regulate your immune response. This disruption could actually lead to more inflammation in your lungs and your airways that carry air through your lungs. Obesity can also affect communication between

your immune system and adipose cells, the cells that carry fat droplets. Because your cells can be like high school students or people who play politics, who are pretty much the same. Their relationships can depend heavily on the surrounding situation and circumstances. They can quickly forget whom their friends are. These are just some of the possible ways that obesity may affect your immune system.

The COVID-19 coronavirus pandemic has been exposing many of the existing weaknesses and problems that the U.S. already had prior to 2020, ranging from a lack of preparedness for a pandemic to a broken health care system to anti-Asian racism. Add the failure to address the obesity epidemic to that list. Now that's caught in a toilet bowl-like spiral with the pandemic. The spread of the COVID-19 coronavirus is preventing people from getting adequate treatment for their obesity, whether it's lifestyle modifications, medical treatment, or bariatric surgery. Furthermore, the pandemic and the resulting social distancing measures may be keeping folks from getting the right amount of exercise and proper diets.

So it wouldn't be too surprising if the obesity epidemic were to get even worse with this COVID-19 pandemic. After all, when you don't do enough to solve a problem, it kind of tends to get worse.