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# How Many Have Died?

BY S. ANDREW SCHROEDER

*There is no such thing as a "true" count of COVID-19 deaths. But trying to measure the pandemic's toll is still a useful exercise.*

How many people in the United States have died from COVID-19? At the end of October, the Centers for Disease Control and Prevention's official tally passed 215,000, making COVID the nation's third-leading cause of death. But can we trust that number? The CDC count surpassed 200,000 at the end of September, yet the *New York Times* reported that the "true coronavirus toll" had topped 200,000 a full month and a half earlier, on August 12. Then there are the skeptics who have claimed that the official numbers grossly exaggerate the situation. One widely circulated social media post retweeted by President Trump claimed that only 6% of the official tally were true COVID deaths. What, then, is the real COVID death toll?

This looks like a paradigmatic case of an empirical question. And, indeed, to answer it will require that we spend a lot of time with the data. We need to scrutinize deaths attributed to influenza to determine which ones might have actually been caused by COVID, and we must

account for regional differences in the availability of COVID testing. But there is a second facet to this question that is far more significant. To know the COVID death toll, we also need to address a complicated set of conceptual issues: what does it mean to *attribute* a death to COVID, or to say a death was *caused by* COVID?

The official CDC count attributes a death to COVID if it is determined to be the "underlying cause of death." That means it is "the disease or injury which initiated the train of morbid events leading directly to death." In other words, a COVID death is one where a COVID infection kicked off a series of health problems that eventually killed a person.

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In most cases, this definition does a good job of picking out deaths that we'd want to attribute to COVID. Imagine, for example, an otherwise healthy person contracts COVID, which leads to pneumonia, acute respiratory distress, and then death. Although someone might propose pneumonia or respiratory distress as the cause of death, COVID does seem the *true* cause of death, since it started the train of events.

In other cases, though, this approach yields questionable conclusions. We all know that certain preexisting conditions greatly increase the risk of death for those with COVID. If someone with severe chronic obstructive pulmonary disease catches COVID and dies, is it really fair to attribute that death to COVID? It seems just as reasonable to attribute the death to COPD. Indeed, in some similar situations official statistics do attribute deaths to the preexisting affliction: for example, when an HIV-positive patient contracts tuberculosis and dies, the World Health Organization dictates that HIV, rather than tuberculosis, be identified as the cause of death.

So when COVID patients have underlying conditions that dramatically increase the risk of death—such as COPD, diabetes, kidney disease, or even just old age—the official COVID statistics will include deaths that might just as reasonably be attributed to a different cause. In other words, they'll overcount COVID deaths.

At the same time, however, the official tally also seems to undercount COVID deaths. The epidemic has killed many people even though they themselves were never infected by the virus. Think of someone with a lung disorder who is unable to be put on a ventilator because they were all being used by COVID patients. Or the person who has a heart attack but doesn't go to the hospital out of fear of contracting COVID. Or the person who has a cancer screening

postponed that would have detected a cancer while it was still treatable. It seems reasonable to blame their deaths on COVID. After all, had COVID not spread as widely as it did, they would still be alive.

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Deaths such as these have led many observers to argue that the official count underestimates the true COVID death toll. They propose an alternative way of assessing COVID deaths by looking at "excess mortality": the number of deaths in some time period above the number expected under normal conditions. When the *New York Times* said that the United States had passed 200,000 COVID deaths by mid-August—a tally more than 20% higher than the CDC count—it arrived at that figure by comparing the number of deaths nationwide since March with the number of deaths during that period in previous years. Since the newspaper could identify no other discernible reason for a large increase in mortality, it concluded that the bulk of those additional deaths was caused by COVID.

Is this a better way to gauge COVID mortality? Well, remember the heart attack victim who stays away from the hospital for fear of COVID. That death will be captured in an excess mortality measure. But is the death really due to COVID? I would want to know more about the person's situation. If the fear was misplaced—if going to a hospital was not really a risky thing to do—and if local health officials were urging residents to access care as normal, then it seems a stretch to blame COVID for that death. The person died due to a heart attack or perhaps even irrational fear, but not COVID. But if the fear was legitimate, and if health officials were warning people to stay away from hospitals due to the unchecked spread of COVID, then things are trickier. Perhaps it wouldn't be unreasonable to say that COVID was really the killer.

That case is complicated; here is an easier one. There have been significant increases in domestic violence in the wake of COVID. Many of the associated deaths wouldn't have happened in a COVID-free world, and so they will be counted in a measure of excess mortality. But isn't it clear that these deaths should be attributed to the people responsible for them? To label them "COVID deaths" would be misleading, ignoring the agency of the abusers.

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It therefore appears that excess mortality statistics may overcount COVID deaths. But just like the official tally, excess mortality statistics will also undercount COVID deaths. In addition to the many lives it has taken, COVID has also saved lives: less vehicle traffic has led to fewer fatal car wrecks, decreased pollution has led to fewer respiratory ailments, and so forth. Because of the way excess mortality statistics are calculated—comparing recent deaths with a pre-COVID baseline—any lives saved by COVID will reduce the number of deaths attributed to it, because they will reduce the total number of recent deaths. In other words, COVID will have one fewer death on its tally for each person whose life is indirectly saved by COVID.

Now, these lives saved are certainly important and worth counting. But it doesn't seem right to say that they reduce the number of deaths caused by COVID. After all, if a drunk driver kills someone but then later rescues someone else from a burning building, we wouldn't say that the drunk driver had caused no deaths. The later act may have been a good one, worth recognizing in its own right. But it wouldn't erase the earlier offense. The person would still be responsible for one death. In the same way, the lives saved by COVID don't cancel out the lives it has taken. If we want to know how many deaths COVID has caused, we shouldn't reduce that number to reflect the lives it has saved.

This discussion has led to a confusing place. We've looked at the two primary measures of COVID-caused deaths, and found that each measure appears to both include deaths that it should exclude *and* exclude deaths that it should include. Are we any closer to figuring out how many deaths COVID really has caused?

## Each measure appears to both include deaths that it should exclude and exclude deaths that it should include.

What the discussion shows, I think, is that we've asked the wrong question. There is no such thing as *the* COVID death toll. There is no simple fact of the matter about which deaths were caused by COVID, as opposed to COPD, old age, heart attacks, or domestic violence. As the philosopher John Stuart Mill explained in 1843, when we try to pick out *the* cause of some outcome, what we single out depends on our interests. Causality is complicated.

Imagine, for example, a man who, frustrated by his continued inability to find a job, drinks excessively and then drives his car off a poorly lit road. What was the cause of the crash? A police officer would probably cite the man's drunkenness as the cause of the crash, since the

officer's job involves identifying violations of the law. A social worker might point to unemployment. And a highway planner might focus on the poor lighting. To ask which of those factors *really* caused the crash is to miss the point. *All* of those factors contributed to the crash, and subtracting any one of them might have prevented it. Each observer, though, picks out a different factor as the cause, since each makes sense of the event in a different way, influenced by a different set of interests.

The same is true of COVID. Which deaths we should attribute to COVID will depend on what we care about. Recall the COVID-negative patient who dies waiting for a ventilator. An infectious disease specialist trying to model the spread of COVID probably wouldn't attribute that death to COVID, since the virus wasn't actually present. But a hospital administrator in charge of emergency preparedness likely would want to label it a COVID-caused death. Though the patient was free of the virus, the death is precisely the sort of death an emergency preparedness program should seek to prevent.

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We, as a society, have many different reasons for wanting to know how many deaths COVID has caused. We want to learn about COVID to slow its spread and to prepare for future epidemics. We want to know how lethal COVID is compared with other ailments such as the flu. We want to compare the US COVID response to that of other countries. We want to know how much blame or credit to assign to government officials. We want to model the economic and social impacts of COVID. And we're simply curious. For each of these purposes a different set of deaths are relevant, and so a different set of deaths are the ones we'd want to attribute to COVID.

This realization can help us to be more sophisticated consumers of COVID information. Contrary to what has been reported in the *New York Times*, the *Journal of the American Medical Association*, or the president's Twitter feed, there is no such thing as *the* true COVID death toll. Excess mortality statistics don't show that the official count underestimates COVID deaths. And those who argue for a lower death toll than the CDC aren't necessarily making a mistake or "rejecting the science." (Although the 6% figure retweeted by President Trump really is unsupportable.) These approaches are simply measuring different things, each of which is *a* way of assessing COVID-caused mortality and useful for specific purposes.

Unfortunately, for many purposes neither of the existing measures provides the right information. Someone interested in knowing how many people have had their lives cut short by the epidemic—how many tragedies to mourn—might want a measure similar to excess

mortality, but which didn't take into account the lives saved by COVID. And someone focused on evaluating how well (or ill-) prepared the nation's health care system was could benefit from a measure similar to the official CDC count, but which also included COVID-negative patients who died due to overburdened hospitals.

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If we want to respond to these and a host of other concerns, we need new measures. Researchers can fill this gap, by developing, publicizing, and explaining alternative approaches to assessing COVID-caused mortality. Crafting these measures will be a challenging endeavor, requiring reflection on society's varied interests, goals, and values. It might seem as if this sort of reflection is beyond the purview of scientists—that scientists should deal purely in facts. But society's varied interests, goals, and values pervade science, too, even if we often pretend they don't. When scientists choose research questions, define terms, analyze data, and manage uncertainty (for example, in arriving at a crisp single integer for COVID deaths), their choices reflect their interests, goals, and values, even if they are not consciously reflecting on such factors.

There remains the question of precisely how scientists should navigate these treacherous waters. My own view is that this is an ideal place for scientists to involve the public, for truly engaged forms of citizen science. Scientists could recruit diverse members of the public and present them with scenarios such as the ones discussed here—the COPD patient, the fearful heart attack victim, the delayed cancer screenings, the increases in domestic violence, and a host of others—and talk with them about which deaths *they* have in mind when they think about COVID deaths. My suspicion is that what would emerge wouldn't line up neatly with either of our current ways of measuring COVID-caused mortality—and would therefore constitute an important contribution to the understanding of the pandemic among the public and scientists alike.

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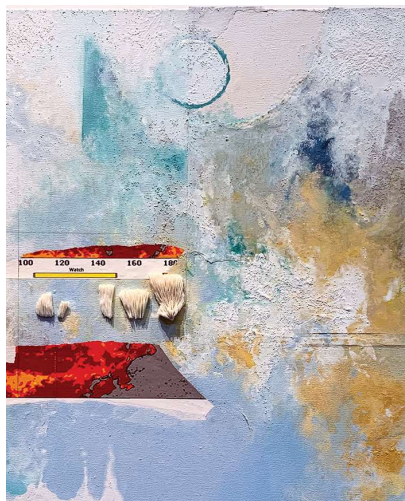## COVID-19

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