

Science You Can Use

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Dear Science: I heard on TV that the number of people who have died from COVID-19 in the US is closer to 900,000, not the 600,000 we've been told. Why is there a difference? -- Buck R.

Dear Buck: The two numbers have different meanings. The smaller number is the number of *confirmed deaths due to COVID-19*; the larger number is the *estimated excess deaths due to COVID-19*. (These terms are defined below.) The Institute for Health Metrics and Evaluation (IHME), a US public-health institute affiliated with the University of Washington, published a study about a month ago comparing confirmed, and estimated excess, deaths due to COVID-19. The numbers you saw on TV came from that study.

Controlling any global pandemic requires accurate global counts of infections, recoveries, and deaths: we can't control what we can't count. Let's look at some details of what "undercounting COVID-19 deaths" means, what has caused the undercount, how large the undercount is in various parts of the world, and what needs to be done to reduce the problem.

What does "under-counting COVID-19 deaths" mean? All COVID-19-related death counts discussed here are limited to deaths immediately caused by COVID-19; indirectly caused deaths, such as those due to the interruption of goods and services caused by the pandemic, are not counted. In any pandemic, the term *confirmed deaths* means those deaths that have been attributed to the disease by someone who could reliably judge the cause of death. In the US and several other countries, the confirmed death count is derived almost entirely from death certificates (which are typically generated by a medical professional). In order to estimate how many deaths were likely caused by COVID-19, IHME compared the number of deaths in the year immediately preceding the pandemic to the number of deaths in the following year, then *assumed* that difference was likely due to COVID-19. (The assumption is reasonable.) That difference is called *estimated excess deaths due to COVID-19*.

What has caused the undercount? Several factors have contributed to undercounting deaths due to COVID-19, including:

- At least 40% of people who had COVID-19 at the time of their death had other life-threatening conditions such as a compromised immune system, major cardiac or pulmonary disease, advanced diabetes, or extreme obesity. Attributing cause of death when multiple contributing factors are present involves a medical judgment call, and that call is not an exact science
- Several COVID-19 symptoms look like the symptoms of pneumonia or extreme cases of flu, so misdiagnosis of cause of death is possible, especially if the deceased has not been tested near death for COVID-19.
- Medical reporting varies widely by country and often by regions within a country. Many of the poorest countries on the planet do not have the means to accurately track and report the causes of death of their citizens.

- Leaders in some countries, including China, North Korea, and Russia, have at various times and solely for political purposes, intentionally underreported the number of deaths due to COVID-19. To this day, Kim Jung Un, the “Supreme Leader” of North Korea, insists his country has had no deaths from COVID-19.

How large is the undercount in various parts of the world? For the period March 2020 to May 2021, IHME estimates the global excess deaths due to COVID-19 to date is about 7 million, compared to the confirmed count of about 3.3 million. Here are some examples, by country, of IHME estimates of number of excess deaths due to COVID-19 (the confirmed COVID-19 deaths for each country are in parentheses):

- United Kingdom – 0.2 million (0.15 million)
- Germany – 0.12 million (0.08 million)
- South Africa – 0.17 million (0.05 million)
- Russian Federation -- 0.6 million (0.1 million)
- US – 0.9 million (0.6 million)

Note that the undercounting is in most cases highest in countries in which public-health infrastructure is weakest. For example, the estimated deaths in South Africa due to COVID-19 is (0.17/0.05 =) three to four times the confirmed death count. In the US, in contrast, as of May 2021, the estimated excess deaths due to COVID-19 is approximately (0.9/0.6 =) 1.5 times the confirmed death count.

What can be done to reduce undercounting and its consequences? We can be certain that the current pandemic is not the last one. Viruses mutate, so the threat is constantly changing. In order to help control pandemics, we need accurate, timely counts of infections, recoveries, and deaths from every nation, and that data has to be shared by all. Accurate counting requires extensive testing and rigorous, consistent reporting protocols. Many nations, including the US, have yet to achieve these goals.

For further information, see “Counting the dead”, *The Economist*, 15 May 2021; see also IHME, “COVID-19 has caused 6.9 million deaths globally, more than double what official reports show”, <http://www.healthdata.org/news-release/covid-19-has-caused-69-million-deaths-globally-more-double-what-official-reports-show>.

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