

all-cause mortality [...] and what would have otherwise been observed without the COVID-19 pandemic". For Japan, 2 836 833 deaths were observed in 2020–21. The estimate of 111 000 excess deaths thus implies 2 725 833 expected deaths. The expected deaths are 0.9% lower than the number of observed deaths in 2018–19 (2 750 245), suggesting that in the absence of the COVID-19 pandemic there would have been a drop in death counts.

However, declining deaths are not in line with the historical trend: the number of annual deaths has been growing without interruption in the past 20 years, with biannual changes in death counts from 2000 to 2019 all being between +1.5% and +7.3% (appendix 1 p 1). By contrast, expected death estimates by the World Mortality Dataset and *The Economist* do not break with the past trend. We found similarly implausible excess mortality estimates for many other countries, including Denmark, Germany, Belgium, Spain, Portugal, and Kazakhstan (appendix 1 p 1; appendix 2 p 2 for calculations). We believe that the estimates of the COVID-19 Excess Mortality Collaborators are unreliable and should not be used for any policy evaluation.

We declare no competing interests.

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1 COVID-19 Excess Mortality Collaborators. Estimating excess mortality due to the COVID-19 pandemic: a systematic analysis of COVID-19-related mortality, 2020–21. *Lancet* 2022; **399**: 1513–36.

2 The Economist. The pandemic's true death toll. 2021. *The Economist*. <https://www.economist.com/graphic-detail/coronavirus-excess-deaths-estimates> (accessed April 25, 2022).

3 Karlinsky A, Kobak D. Tracking excess mortality across countries during the COVID-19 pandemic with the World Mortality Dataset. *eLife* 2021; **10**: e69336.

The COVID-19 Excess Mortality Collaborators concluded that "The full impact of the pandemic has been much greater than what is indicated by reported deaths due to COVID-19 alone". They estimate that 18.2 million (95% CI 17.1–19.6) people died worldwide because of the pandemic (as measured by excess mortality) in 2020–21, instead of the reported COVID-19 deaths of 5.94 million worldwide during that period, as WHO claims.

I agree with the principle of estimating excess mortality due to the pandemic, not only the reported COVID-19 deaths, but the results of the authors' recalculation of deaths raise many perplexities.<sup>1</sup> They found that the gap between estimated excess mortality and reported COVID-19 deaths was much larger in south Asia and sub-Saharan Africa than in other regions. Therefore, the estimated excess deaths for a European country, such as Italy, should be closer to official statistical data. However, in the example of Italy, this is not the case. In Italy, the reported COVID-19 deaths are 137 000 in 2020–21, whereas the authors' estimated excess deaths are 259 000 (242 000–276 000).<sup>1</sup> The data published by the Italian National Institute of Statistics<sup>2,3</sup> show an all-cause mortality excess of 100 526 more deaths in 2020 and 63 415 in 2021, compared with the average number of deaths in the 5-year period from 2015 to 2019. This totals to 163 941 more deaths in the 2-year period from 2020 to 2021. These deaths are 95 059 fewer than those calculated by the COVID-19 Excess Mortality Collaborators.<sup>1</sup> Their numbers are implausible, implying that, without the pandemic, the average mortality in Italy from 2015 to 2019 would be reduced by 7.36% in 2020–21.

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Excess mortality is an important metric summarising COVID-19 disease burden, informing public health policy and future preparedness needs.<sup>1</sup> However, separating the deaths that occurred from COVID-19 versus those from all other causes is challenging. Essentially, the unknowns are the counterfactual, should an infection wave not have happened. A solution to this challenge is to estimate expected number of individuals who would have died and compare this with the observed number of deaths. The estimation of expected number of deaths must consider changes in population and seasonal dynamics and be based on an appropriate reference period. The COVID-19 Excess Mortality Collaborators<sup>2</sup> present an important study that estimates 18.2 million excess deaths spread across 191 countries and territories in the first 2 years of the COVID-19 pandemic, 2020 and 2021. The authors use an ensemble-based approach to estimate global excess mortality due to data paucity in many countries. Although this global estimate might be broadly correct and serves as an important reminder of the effect of COVID-19, we strongly caution against the over-interpretation of the constituent country estimates. For European countries, we instead recommend the



See Online for appendix 1

See Online for appendix 2