

Conflicting COVID-19 excess mortality estimates

A study¹ by the COVID-19 Excess Mortality Collaborators estimates more than 18 million COVID-19 deaths globally by the end of 2021—three times those reported. The COVID-19 Excess Mortality Collaborators claim that under-ascertainment is especially severe in sub-Saharan Africa, with actual deaths 14 times higher than the 150 000 reported—more than 2 million excess deaths across the region in 2020–21.

Although we welcome efforts to quantify the burden of the pandemic, we consider this level of under-reporting of deaths implausible. There is no evidence of such a huge death toll and COVID-19 particularly affected large cities where spikes in the mortality rate would be readily visible.² We note the modelling approach in the study¹ assumes a homogeneous Africa, well represented by a few, atypical locations, leading to unreliable out-of-sample extrapolations. For example, the estimates for Kenya equate to an increase of more than 50% from a baseline of 280 000 deaths annually and imply that a country with alert health services and a mandatory death registration system identified only 3% of COVID-19-related deaths.

Although the COVID-19 pandemic has undoubtedly been a substantial public health problem in Africa, no regional estimates suggest such a high death toll.³ The WHO African region's own estimates suggest a seroprevalence of more than 50% and 430 000 COVID-19 deaths, corresponding to one in three deaths being reported in 2020–21,⁴ an under-reporting rate comparable with the rest of the world. The focus should be on understanding the mechanisms responsible for this outcome,⁵ rather than creating narratives suggesting that African health authorities were uniquely incompetent.

We declare no competing interests.

© 2023 World Health Organization. Published by Elsevier Ltd. All rights reserved

Matshidiso Moeti, Lindiwe Makubalo, Abdou Salam Gueye, Thierno Balde, Humphrey Karamagi, Gordon Awandare, S M Thumbi, Feifei Zhang, Francisca Mutapi, *Mark Woolhouse

mark.woolhouse@ed.ac.uk

WHO Regional Office for Africa, Brazzaville, Democratic Republic of the Congo (MM, LM, ASG, TB, HK); West African Centre for Cell Biology of Infectious Pathogens, University of Ghana, Accra, Ghana (GA); Center for Epidemiological Modelling and Analysis, University of Nairobi, Nairobi, Kenya (SMT); Paul G. Allen School for Global Health, Washington State University, Pullman, WA, USA (SMT); National Institute of Health Data Science, Peking University, Beijing, China (FZ); Tackling Infections to Benefit Africa, University of Edinburgh, Edinburgh EH9 3FL, UK (SMT, FZ, FM, MW)

- 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 Zhang F, Karamagi H, Nsenga N, et al. Predictors of COVID-19 epidemics in countries of the World Health Organization African region. *Nat Med* 2021; **27**: 2041–47.
- 3 Cabore JW, Karamagi HC, Kipruto H, et al. The potential effects of widespread community transmission of SARS-CoV-2 infection in the World Health Organization African region: a predictive model. *BMJ Glob Health* 2020; **5**: e002647.
- 4 Cabore JW, Karamagi HC, Kipruto HK, et al. COVID-19 in the 47 countries of the WHO African region: a modelling analysis of past trends and future patterns. *Lancet Glob Health* 2022; **10**: e1099–114.
- 5 Mbow M, Lell B, Jochems SP, et al. COVID-19 in Africa: dampening the storm? *Science* 2020; **369**: 624–26.

Although the global review of excess deaths from the COVID-19 pandemic might seem to give authorities in some countries encouragement for their policies,¹ it seems unfortunate that a key vulnerable group was missing from discussion in the paper.

Older people living in nursing homes were particularly affected by the pandemic, with very elevated levels of deaths, morbidity, and deprivation of civil liberties through restriction of movement and visiting. Countries with apparently successful strategies for avoiding excess deaths among the whole population, such as Ireland and

Sweden, had very high levels of deaths in nursing homes.² If these deaths had occurred among children or in children's residential settings, there probably would have been outrage and urgent remedial and preventive action taken for both present and future pandemics. The health-care community needs to develop a similar sense of focus and action for this most vulnerable, and yet neglected, group of citizens,³ and consider the determinants of this troubling disparity of equity of support and care.⁴

I declare no competing interests.

Desmond O'Neill
doneill@tcd.ie

Department of Medical Gerontology, Tallaght University Hospital, Dublin D24 NR0A, Ireland

- 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 Aalto UL, Pitkälä KH, Andersen-Ranberg K, et al. COVID-19 pandemic and mortality in nursing homes across USA and Europe up to October 2021. *Eur Geriatr Med* 2022; **13**: 705–09.
- 3 O'Neill D. COVID-19 in care homes: the many determinants of this perfect storm. *BMJ* 2020; **369**: m2096.
- 4 O'Neill D. Reflecting on our perceptions of the worth, status and rewards of working in nursing homes. *Age Ageing* 2018; **47**: 502–04.

To estimate the COVID-19 death toll, the COVID-19 Excess Mortality Collaborators¹ have presented excess mortality estimates for 2020–21 for all countries in the world. We argue that for many countries, these estimates are implausible because they imply an unrealistic number of expected deaths, inconsistent with trends before the pandemic. A case in point is Japan, where the authors estimated 111 000 (95% CI 103 000–116 000) excess deaths from Jan 1, 2020, to Dec 31, 2021—an order of magnitude higher than the estimate by *The Economist*² (12 000) and qualitatively different from the World Mortality Dataset's³ negative estimate (–13 100). The COVID-19 Excess Mortality Collaborators define excess mortality as "the difference between reported



Submissions should be made via our electronic submission system at <http://ees.elsevier.com/thelancet/>

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.

***Jonas Schöley, Ariel Karlinsky,
Dmitry Kobak, Charles Tallack
schoeley@demogr.mpg.de**

Max Planck Institute for Demographic Research, 18057 Rostock, Germany (JS); Department of Economics, The Hebrew University of Jerusalem, Jerusalem, Israel (AK); Hertie Institute for Artificial Intelligence in Brain Health, University of Tübingen, Tübingen, Germany (DK); The Health Foundation, London, UK (CT)

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.¹ 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).¹ The data published by the Italian National Institute of Statistics^{2,3} 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.¹ 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.

I declare no competing interests.

**Alberto Donzelli
adonzelli@ats-milano.it**

Fondazione Allineare Sanità e Salute, Milan 20131, Italy

- 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.
- Istituto Nazionale di Statistica, Istituto Superiore di Sanità. Impatto dell'epidemia COVID-19 sulla mortalità totale della popolazione residente. Anno 2020 e gennaio–aprile 2021. Sixth report. https://www.iss.it/documents/20126/0/Report_ISS_Istat_2021_10_giugno+%281%29.pdf/3df35cd3-edd5-56e1-5867-d274f5032fb5?t=1623336923282 (accessed April 20, 2022).
- Istituto Nazionale di Statistica, Istituto Superiore di Sanità. Impatto dell'epidemia COVID-19 sulla mortalità totale della popolazione residente. Anni 2020–2021 e gennaio 2022. Seventh report. https://www.istat.it/it/files//2022/03/Report_ISS_ISTAT_2022_tab3.pdf (accessed April 20, 2022).

Excess mortality is an important metric summarising COVID-19 disease burden, informing public health policy and future preparedness needs.¹ 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 Collaborators² 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