Africa's COVID-19 statistics highlight bias in excess death modelling

Despite high levels of informality, Africa's statistics on COVID-19 mortality have been paradoxically low in comparison to countries in the Global North. Examining studies that attribute low counts to poor statistical reporting, **Kate Meagher** *argues that excess death estimates tell us more about the assumptions of the modellers than they do about the realities of COVID-19 in Africa.*

Africa was expected to be badly hit by the COVID-19 pandemic owing to extreme socio-economic vulnerability. Informality accounts for 72% of African urban employment, compounded by weak health systems and the lowest rate of social protection in the world. International organizations warned that Africa's vast informal workforce would face a stark choice between contagion or starvation. The UNECA predicted up to 3.3 million African deaths by the end of 2020, while Melinda Gates spoke of 'bodies on the streets'. Yet statistics show that Africa had the lowest COVID-19 mortality rates by far. WHO data reveal COVID-19 death rates in Africa to be about 13% of those in Europe and North America. Africa not only appears to have suffered less from the pandemic than developed countries, but I have shown in a recent article that COVID-19 mortality rates have been inversely proportional to levels of informality, at the inter-regional level as well as among African sub-regions.

What accounts for this paradoxical relationship between informality and COVID-19 mortality? Is it a product of 'poor numbers' in Africa and other regions with large informal economies? Or is it further evidence of a poor understanding of how the pandemic has intersected with Africa's economic, social and political realities? A closer examination raises questions about the tendency to remaster Africa's COVID-19 mortality figures, using statistical modelling to confirm rather than interrogate global public health narratives.

Paradoxes and statistical tricks

Data on informality from the International Labour Organization shows that informality in

Africa is roughly 50% higher than in Latin America and more than four times the level in developed countries. Yet 18 months into the pandemic, globally-recognised Worldometer data reveal that COVID-19 mortality rates in Africa were 18% of those in Latin America, and 20% of rates in developed countries. Within Africa as well, where informality varies among regions, West Africa is more than twice as informalised as Southern Africa, yet COVID-19 mortality rates in West Africa were less than one-tenth of the toll in Southern Africa.

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Africa's counter-intuitive mortality data has been challenged by a spate of excess mortality models claiming that the continent's low mortality figures dramatically under-represent the true impact of the pandemic. Excess mortality estimates produced by The Economist show that Sub-Saharan Africa has the highest excess mortality ratio of all regions. A study by Wang et al. published in the Lancet claims the gap between estimated and reported COVID-19 deaths is higher in south Asia and sub-Saharan Africa than in other regions.

While excess mortality models are viewed as correctives of poor quality African data, a closer look raises important questions about their reliability. Two statistical issues are particularly problematic: an emphasis on excess death *ratios* rather than death *rates*, and a tendency to extrapolate data from the Global North to model 'real' outcomes in Africa. Prominent excess mortality reports show a propensity to sensationalise African mortality figures by highlighting excess death *ratios* – the ratio of excess death estimates to reported deaths. A table from the Economist's report put Africa's excess death ratios at +700%, the highest of all regions, while Wang et al. repeatedly distinguish Sub-Saharan Africa as having one of the highest gaps between estimated excess to reported deaths. Yet, hidden among these dramatic claims, both studies note that Sub-Saharan Africa, excluding Southern Africa, had particularly low mortality *rates*. High excess death *ratios* are simply an artefact of high excess death estimates relative to low reported deaths. Even these liberal estimates still leave most African countries with among the lowest imputed COVID-19 death rates in the world.

Poor numbers or poor modelling?

A second concern relates to the tendency of global excess mortality studies to use data from developed countries to estimate excess deaths in Africa, despite clear differences in conditions. While prominent excess death models take account of demographic differences, they universalise ecological and biophysical factors on the assumption that these would operate in the same way in Senegal as they do in Spain. The Economist's model was trained on data from rich and middle-income countries, and Wang et al. also admit to using data from the developed world to estimate missing African data, overriding significant differences in transmission contexts and underlying health conditions. The Economist also notes that its model over-estimates mortality in cases where access to health services is weak, which is the case in much of Africa.

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An excess mortality study on the African region by Cabore et al. shows that the universalizing urge inherent in global modelling rides roughshod over evidence that the trajectory of COVID-19 in Africa was different from other regions. A range of factors have limited susceptibility to the virus in Africa, including the world's youngest population profile, lower levels of urbanization, greater open-air food provisioning, pre-existing immunities, and timely public health responses. While taking account of the limitations of local data, Cabore et al. caution against the tendency to fill data gaps with globally modelled estimates that ignore important locally specific factors. A detailed methodology emphasizes the importance of engagement with available local data to fill gaps and guide reliable estimates. The authors demonstrate that estimates based on African conditions are both possible and preferable to building models by extrapolating data from other regions.

The Tyranny of Implausible Estimates

A growing range of evidence indicates that dramatic global excess death estimates for Africa are both implausible and uncorrelated with known events and realities in the region. Prominent excess death models show a propensity to extravagant errors of inclusion, inappropriate estimation procedures, and positively baggy confidence limits. The Economist model confesses to excess death estimates sometimes exceeding the

population of a whole country. Global models estimate COVID-19 mortality rates for Sub-Saharan Africa at 14 times official figures. Wang et al. suggest that an estimated 480,000 deaths went largely unnoticed in West Africa during the pandemic – nearly 50 times the number that died from Ebola. East Africa is estimated to have suffered over one million deaths over the same period, yet the statistical machinery only caught 29,000. Given the lack of apocalyptic news reports outside of Southern Africa, it is frankly improbable that such extreme death rates would have escaped local as well as international attention. More realistic estimates by Cabore et al. put excess death rates at just under three times Africa's official figures, while Worldometer's real-time estimates come in at 1.5 times official data.

The Economist admits that their own excess death estimates are 'extremely rough', yet claims about dramatically higher African death rates are accepted with little scrutiny. Instead of provoking deeper research into the paradox of low African death rates amid high informality, statistical modelling is simply brought in to 'normalize' Africa's anomalous pandemic outcomes. In the process, excess death models provide circular evidence that COVID-19 had similar effects in Africa as elsewhere, obscuring the important question of why African death rates were so low amid rampant informality. This calls for a decolonisation of statistical modelling as a key part of the project of decolonizing global health.

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