Dear Editor,

COVID-19, the disease caused by the SARS-CoV-2 virus spread fast globally, with the number of confirmed cases exceeding 8 million. In a short period of time, scientists are working around the clock trying to understand the various aspects of COVID-19. In epidemiology, the definition of case-fatality rate is “the proportion of cases of a specific condition that are fatal within a specified time”. Case-fatality is an indicator of the capacity of a disease to cause mortality, but there are concerns about its use as an appropriate epidemiological indicator for COVID-19.

Testing policies in each country, which are highly dependent on test availability, can lead to severe underreporting on the number of cases, the proper denominator of case-fatality. Given that the level of underreporting is lower for hospitalisation cases and for deaths, it is arguable that the degree of underreporting for COVID-19-related deaths is much lower than the underreporting of cases.[1]

The use of an appropriate death indicator is relevant for the World Health Organization, other international organizations, policymakers, and political leaders. Such indicator would help support adequate public health and economic strategies. However, the most frequently used indicator so far is the case fatality rate,[2,3] which we argue is not an appropriate indicator to report COVID-19 mortality due to massive underreporting of its denominator. The absolute number of deaths per day is also not a good approach, since it does not consider the size of the population. Therefore, many indicators highly cited by the media are biased.[1,4]

The question is: what could be used to better estimate the deaths due to COVID-19, to adequately allow cross-country comparisons, time trends and other epidemiological statistics with a minimal level of bias to reflect the real scenario? Based on the above reasons and on Table 1 data, we recommend the use of deaths per million inhabitants as an alternative to allow comparisons between and within countries. Deaths per million is not affected by underreporting of cases, as well as properly adjusts for the size of the population. Furthermore, this indicator can also be used for subgroups of the population (e.g., older adults).

COVID-19 is a great challenge and there are many scientific gaps that need to be addressed.[5] In summary, there is a clear and urgent need to improve COVID-19 statistics, particularly to engage the public in prevention strategies. The use of a more reliable mortality data will help countries to better understand the problem, ensure appropriate strategies to re-organize their health-systems, increase intensive care units capacity, number of ventilators and, finally, establish effective measures to reduce deaths. The coronavirus pandemic is one the biggest challenges faced by the scientific community globally in many fronts, including new approaches in Epidemiology. Comparing trends and monitoring the situation using deaths per million inhabitants will be a more adequate approach and, ultimately, a better indicator to reduce COVID-19 mortality.

Financial support and sponsorship
Nil.

Conflicts of interest
There are no conflicts of interest.

Erika A. Silveira1,2, Matias Noll1,3, Pedro C. Hallal4, Cesar de Oliveira4

1University Federal de Goiás, Medicine Faculty, Brazil, 2Instituto Federal Goiano, Brazil, 3Federal University of Pelotas, Brazil, 4Department of Epidemiology and Public Health, Institute of Epidemiology, and Health Care, University College London, UK
Address for correspondence:
Prof. Erika A. Silveira,
University Federal de Goiás, Medicine Faculty, Brazil,
Affiliate Academic, Department of Epidemiology and Public Health,
University College London, UK.
E-mail: erikasil@terra.com.br

Table 1: Countries with over one thousand COVID-19 deaths by June 17 2020: comparison between case-fatality and deaths per million

| Country       | Case-fatality rate | Deaths per millions |
|---------------|--------------------|---------------------|
| Belgium       | 16.06              | 833.76              |
| France        | 15.15              | 451.01              |
| Italy         | 14.48              | 568.47              |
| United Kingdom| 14.03              | 619.47              |
| Netherlands   | 12.35              | 355.35              |
| Mexico        | 11.69              | 136.35              |
| Spain         | 11.10              | 580.38              |
| Sweden        | 9.26               | 489.04              |
| Canada        | 8.28               | 218.01              |
| China         | 5.49               | 3.22                |
| USA           | 5.48               | 351.21              |
| Brazil        | 4.94               | 206.81              |
| Iran          | 4.71               | 107.92              |
| Germany       | 4.68               | 105.22              |
| Peru          | 2.94               | 208.05              |
| India         | 2.88               | 7.173               |
| Turkey        | 2.68               | 57.21               |
| Russia        | 1.33               | 49.84               |

Source: Deaths - Johns Hopkins website, Population - Worldometer.
Received: 22 Jun 20  Accepted: 10 Feb 21
Published: 05 Apr 22

References

1. Mahase E. Covid-19: Death rate is 0.66% and increases with age, study estimates. BMJ 2020;369:m1327. doi: 10.1136/bmj.m1327.
2. Park M, Cook AR, Lim JT, Sun Y, Dickens BL. A systematic review of COVID-19 epidemiology based on current evidence. J Clin Med 2020;9:967.
3. Baud D, Qi X, Nielsen-Saines K, Musso D, Pomar L, Favre G. Real estimates of mortality following COVID-19 infection. Lancet Infect Dis 2020;20:773.
4. Lipsitch M, Donnelly CA, Fraser C, Blake IM, Cori A, Dorigatti I, et al. Potential biases in estimating absolute and relative case-fatality risks during outbreaks. PLoS Negl Trop Dis 2015;9:e0003846.
5. Weiss P, Murdoch DR. Clinical course and mortality risk of severe COVID-19. Lancet 2020;395:1014-5.