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# COVID-19 and dengue fever: A dangerous combination for the health system in Brazil

*To the Editor,*

The outbreak of coronavirus disease (COVID-19) caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) has spread worldwide. The number of COVID-19 cases has been on a rapid rise in Brazil, with the first records of death [1]. Simultaneously, the country is facing the outbreak of dengue fever, a known tropical disease. According to the Ministry of Health, the number of probable dengue cases increased by almost 19%, from 79,131 between December 29 and February 01 in 2019 to 94,149 in the same period in 2020. In 2019, about 2.3 million dengue cases were registered nationwide. Even in south regions of the country where the outbreak of dengue fever had never occurred, the number of dengue cases has been increasing at an alarming rate, with several deaths being recorded [2]. The number of dengue cases is often observed to increase at the beginning of the year due to the rainy season and high temperatures and peak between March and April. Meanwhile, the peak of the COVID-19 outbreak in Brazil is forecast to occur between late April and early May, when respiratory diseases are most commonly found. This temporal coincidence implies that the two outbreaks may happen at the same time. This would cause great damage to population and therefore require intensive attention from both the private health system and the public Unified Health System (SUS).

Dengue fever and COVID-19 are difficult to distinguish because they share clinical and laboratory features [3]. Some authors described cases who were wrongly diagnosed as dengue but later confirmed to be COVID-19 [4]. Besides, co-infections with arboviruses and SARS-CoV-2 have not been well studied. In the midst of this complex epidemiological scenario, the fragile healthcare system in Brazil is facing the risk of collapse and multiple socio-economic issues [5]. For example, Constitutional Amendment 95 established the public spending limits, and in 2019, the health budget reduced by R$ 9 billion. There may not be enough intensive care units to accommodate even 25% of hospitalized patients with COVID-19. The lack of specific diagnostic tests, especially the real-time RT-PCR, would also make it challenging to perform early detection of virus importation and prevent onward transmission [5]. Another concern lies in the costs of hospitalization due to dengue fever. The Brazilian government paid R$ 31 million for the hospitalization of approximately 100,000 dengue cases during the outbreak in 2010. With over 150 million Brazilians depending exclusively on the SUS, this situation can become absolutely critical. COVID-19 alone has a great potential to overwhelm the health system. If it was accompanied by dengue fever, this burden would be even greater.

Brazil is making every effort to keep the number of COVID-19 cases from rising. However, a proportion of patients have been not diagnosed due to the insufficiency of specific tests. According to recent studies, many infected cases were not documented, thereby accelerating the spread of SARS-CoV-2 [6]. Therefore, to contain the epidemic, large

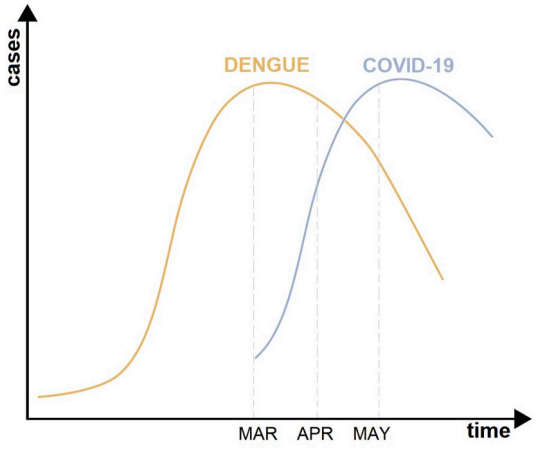


**Fig. 1.** Hypothetical scenario of dengue and COVID-19 emergence. The number of dengue cases is inclined to increase at the start of the year due to the hot, humid weather, and hit a peak between March and April. The outbreak of COVID-19 in Brazil is predicted to peak sometime in the most favourable season for respiratory diseases between late April and early May. As the two outbreaks have a high likelihood of coinciding in terms of time, the burden of diseases may boost, requiring the Unified Health System (SUS) to put their greatest efforts into the double-fight against the outbreaks. *The number of dengue cases is not proportional to that of COVID-19 cases; this is only an extrapolation to visualize each peak.

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investments in research are required to gain an insight into the epidemiology, transmission, and incubation period of COVID-19, and develop tests, vaccines, and medicines. In response to COVID-19, the Brazilian Government has declared a state of emergency, allowing cities to take extraordinary measures. For example, based on the Annual Budget Law, more than R$ 5 billion will be dedicated to combating the outbreak of COVID-19. Intensified surveillance, resources, and viral identification assays should be urgently prioritized to detect COVID-19 cases and to limit transmission. A combination of these measures may help to increase reporting of these cases, thus slowing down the spread of the COVID-19 outbreak(see Fig. 1).

## Ethics approval and consent to participate

The ethical approval or individual consent was not applicable.

## Availability of data and materials

All data and materials used in this work were publicly available.

## Consent for publication

Not applicable.

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## Authors' contributions

All authors conceived the study, discussed the results, drafted the first manuscript, critically read and revised the manuscript, and gave final approval for publication.

## Declaration of competing interest

The authors declared no competing interests.

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