

## Simultaneous occurrence of COVID-19 and dengue: what do the data show?

Ocorrência simultânea de COVID-19 e dengue:  
o que os dados revelam?

Ocurrencia simultánea de COVID-19 y dengue:  
¿qué revelan los datos?

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COVID-19, the emerging disease caused by the novel coronavirus SARS-CoV-2, has impacted all sectors of society, above all the health systems, due to its rapid spread across all the continents, the capacity to cause deaths in vulnerable populations, and incomplete knowledge on the virus, its pathogenesis, and treatment. As of May 14, 2020, there had been 4,307,287 confirmed cases worldwide, with 295,101 deaths <sup>1,2,3,4</sup>.

In Brazil, precarious housing and sanitation conditions with overcrowding and inconsistent access to safe running water, unfavorable socioeconomic indicators that reflect the poor living standards of the majority of the population, and the high prevalence of chronic diseases like hypertension and diabetes (risk factors for COVID-19), exacerbate the impacts and hinder strategies for confronting the disease. Several Brazilian states are already risking the imminent collapse of their health services <sup>5</sup>.

Besides the COVID-19 epidemic, Brazil has faced seasonal dengue epidemics from March to June since 1986. The increase in rainfall and gaps in *Aedes aegypti* mosquito vector control have contributed to the rise in dengue during this period. The situation is similar with respiratory diseases like influenza, which display seasonal outbreaks, especially in the cooler autumn and winter months. With the spatial and temporal coincidence of these diseases, the Brazilian Unified National Health System (SUS), which already presented deficiencies in clinical care for dengue and other diseases, was forced to quickly expand its physical infrastructure, purchase equipment and supplies, build field hospitals, train health-care professionals, and increase its testing capacity <sup>6,7,8,9,10,11,12</sup>. Still, the impact of COVID-19 on the public healthcare system appears most acutely in the high demand for hospitalization, exhausting the supply of intensive care beds and mechanical ventilators in some regions of Brazil <sup>13</sup>.

COVID-19 and dengue present several clinical and laboratory similarities. Yan et al. <sup>14</sup> observed that patients infected with SARS-CoV-2 and diagnosed with dengue via rapid tests evolved to more serious clinical status, delaying effective treatment. False-positive diagnoses and less sensitive laboratory methods can lead to health complications for patients and favor the spread of COVID-19, further overloading the public healthcare system <sup>6,14,15</sup>.

The number of reported dengue cases in Brazil as of epidemiological week (EW) 17 of 2020 exceeded the number of cases in EW 7 of 2015 and EW 11 of 2019. However, starting in EW 10 there was a decline in the number of reported dengue cases, coinciding with the period in which health measures in Brazil were stepped up for the fight against COVID-19, suggesting possible underre-

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porting during a period in which a seasonal increase in dengue cases would have been expected in the country <sup>16</sup>.

The Northeast of Brazil showed the second lowest dengue incidence of all the country's regions (82.5/100,000 inhabitants) in EW 17 of 2020. In the state of Piauí in the Northeast, accumulated dengue incidence was 20.2/100,000 inhabitants in EW 17 of 2020, or a decrease of 74.5% compared to the same period in 2019 <sup>16,17</sup>. Observing the recent historical dengue series in Piauí, dengue incidence in 2020 was close to the pattern of occurrence of the disease according to the mean coefficient for the years 2016 to 2019 <sup>17</sup>. However, starting in the week in which the first confirmed cases of COVID-19 were reported in Piauí (EW 12) <sup>18</sup>, there was an exponential increase in COVID-19 cases, simultaneously with a reduction in recorded dengue incidence (Figure 1).

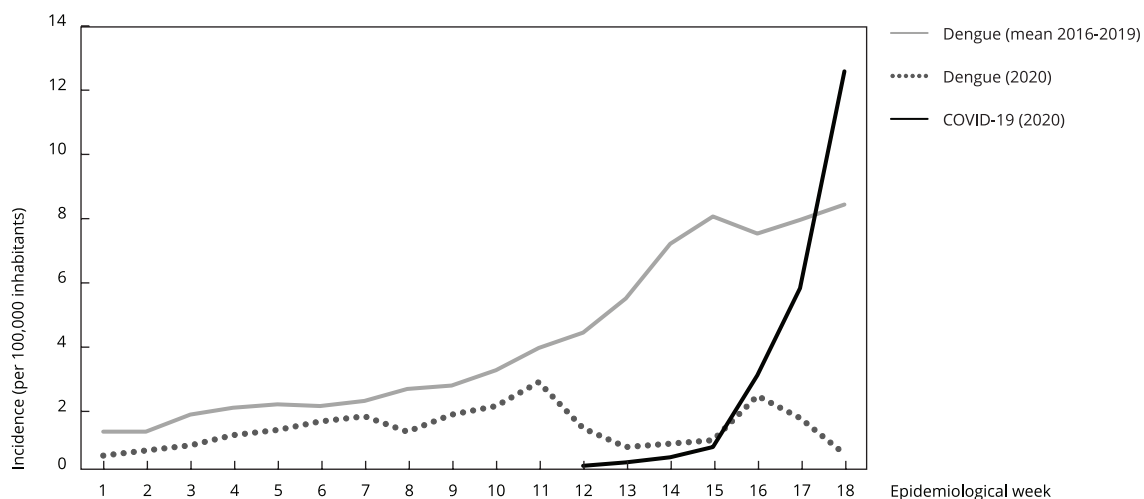
This abrupt change in the behavior of epidemiological data on dengue reinforces the hypothesis of underreporting of cases in Piauí. Based only on the currently available incidence rates, the estimated risk of COVID-19 (incidence of 12.6 cases/100,000 inhabitants) in the population of the state of Piauí would be 25 time greater than the risk of dengue (incidence of 0.5 cases/100,000 inhabitants) in the same population in EW 18.

This observation reinforces the need to alert health professionals to suspect and report cases. An additional challenge is to understand the progression of the “underestimated” dengue epidemic simultaneously with the occurrence of COVID-19 cases, with the health systems experiencing signs of exhaustion and incomplete knowledge on the effects of co-infection in the same patient, which may further overload the system <sup>6,14</sup>.

The fight against these diseases requires effective awareness-raising strategies with the population to eliminate mosquito breeding sites, wash hands, wear masks, and above all practice social distancing. It is also essential to strengthen the SUS and focus resources to organize health systems in order to reduce inequalities in access and offer quality care to the entire population both in primary healthcare, where mild cases of both diseases are treated, and in hospital care, reserved for cases with higher complexity. Since primary care is defined as the preferred point of access to care for persons with suspicion of dengue and COVID-19, primary healthcare is an essential component of the health system and should be strengthened and prepared for timely treatment, adequate clinical management, and referral of severe cases, as well as for comprehensive treatment of primary healthcare-sensitive conditions <sup>19</sup>.

**Figure 1**

Dengue and COVID-19 incidence. Piauí State, Brazil, 2016-2020.



## Contributors

M. D. M. Mascarenhas contributed to the study conception and project, data analysis and interpretation, and writing of the article; is responsible for all aspects of the work, guaranteeing the accuracy and integrity of any and all parts of the research. F. M. A. Batista contributed to the study conception and project, data analysis and interpretation, and writing of the article; is responsible for all aspects of the work, guaranteeing the accuracy and integrity of any and all parts of the research; and approved the final version for publication. M. T. P. Rodrigues, O. A. A. Barbosa, and V. C. Barros contributed to the writing of the article and the critical revision of the intellectual content; and approved the final version for publication.

## Additional informations

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## Conflict of interest

The authors have no conflict of interest to declare.

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