



# Concurrent epidemics of dengue and COVID-19 in Peru: Which way forward?

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## Introduction

Dengue is a viral disease transmitted by the mosquitoes of *Aedes* species (*Aedes aegypti* or *Aedes albopictus*), already infected by one of the four strains of the virus (DENV-1, DENV-2, DENV-3 and DENV-4).<sup>1</sup> The disease contributes to a worldwide death rate of 100 million per year.<sup>2</sup> The greatest burden is faced by Southeast Asia, followed by Latin America.<sup>3</sup>

In Peru, since the great epidemic of dengue in 1990, cases have remained and health authorities have been focused on controlling outbreaks.<sup>4</sup> In the last decade there has been an increase in cases, especially in 2010, due to the entry of the DENV-2 lineage, and also in 2017, the year in which approximately 68 thousand cases were reported due to the El Niño.<sup>5</sup>

During the first months of 2021 (Figure 1), more than 14 thousand cases have been registered in Peru, which means a 34% increase in dengue cases compared to the same period in 2020. This increase has been reported mainly in the Amazonian regions of Loreto, Madre de Dios and Ucayali.<sup>6</sup> Likewise, cases have been reported in the coastal cities of Ica and Lima. Due to this, the Ministry of Health of Peru has declared a national epidemiological alert. This article aims to discuss the increase in the number of dengue cases in Peru during the COVID-19 pandemic and potential interventions to tackle the ongoing crisis.

## Epidemiology

In recent decades, the incidence of dengue worldwide has increased significantly. In Peru, the figures have

been maintained over the last few years with a tendency to increase the number of cases. However, a large part of dengue patients are asymptomatic or oligo-asymptomatic, therefore the incidence data is not necessarily optimal.

Since the re-entry of *Aedes aegypti* in 1984 to Peru, cases have been increasing, especially in the Amazon regions. With the entry of the American / Asian genotype DENV-2 in 2010, the severity and mortality of cases increased significantly and led to a crisis in the demand for health services. Later, in 2017, due to the El Niño Phenomenon, a large number of cases were reported especially in northern coastal cities.<sup>7</sup>

One of the main problems that led to the high prevalence of the virus, apart from the tropical geographical localization, is the storage of water. In rural areas, most homes do not have a sewage system and must store water in containers (tanks and cylinders), and their misuse predisposes the growth of the *Aedes aegypti* vector. In fact, even in major cities, such as Iquitos and Pucallpa, there is an important lack of access to drinking water and sewerage, which favours inadequate water storage and conditions for vector reproduction, contributing to dengue endemicity.

## Challenges and efforts

Peru, like other South American countries,<sup>8,9</sup> has been facing a substantial increase in the number of new cases of arboviruses. In fact, the dengue season has coincided with the ongoing COVID-19 pandemic in regions like Guayaquil, in Ecuador, and Iquitos, in Peru.

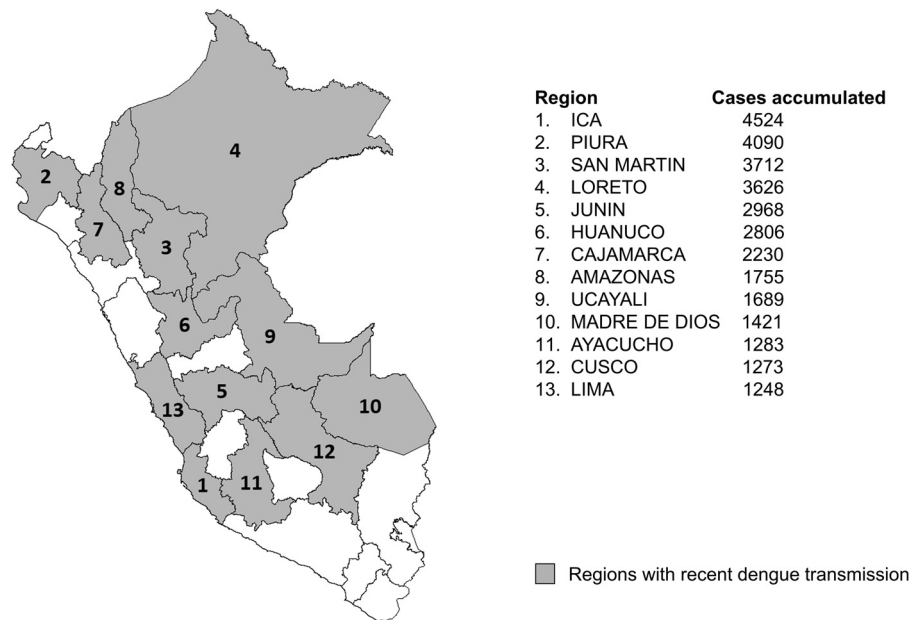
Among the factors that contributed to this outbreak of dengue, there is the interruption of epidemiological surveillance programs, the reduction of fumigation activities, elimination of mosquito breeding sites and other entomological control measures, either for fear of transmission by SARS-CoV-2 or the redirection of health resources towards coronavirus control. Also, education activities for the population about dengue were

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**Figure 1.** Number of dengue cases registered in Peru from January 2021 to August 2021 (Source: Ministry of Health, Peru).

interrupted. These factors favoured the dengue outbreak, especially in endemic regions.

The similarity of symptoms between dengue and COVID-19 is also one of the challenges faced when dealing with both diseases. Mild symptoms of dengue fever include nausea, vomiting, rashes, fever, aches, and pain.<sup>10</sup> On the other hand, COVID-19 can lead to a series of symptoms like fever, cough, breathlessness, fatigue, loss of smell or taste, sore throat, diarrhoea, nausea, etc.<sup>8,11</sup>

Even though the respiratory symptoms usually associated with COVID-19 could help distinguish both diseases, during the pandemic, the fear of being infected by a coronavirus and the high number of patients waiting to be seen in health units, often led to an inadequate assessment by health professionals when performing the differential diagnosis. Therefore, any patient with a fever could be classified as COVID-19.

This scenario increases the public health problem, as it can lead to an incorrect diagnosis of one of the diseases and delay in the initial management and support measures for the patient. It also increases the chance of underdiagnosis, especially in cases where there is coinfection.

Faced with this, various efforts are being made by the Peruvian Ministry of Health and the main health authorities to control the outbreak, such as:<sup>12</sup>

**Vector control:** Mosquito fumigation, eradication activities and activities related to water sanitation have been resumed.

**Education of the population:** Bad practices that favoured the spread of mosquito larvae were identified, mainly those related to inadequate water storage.

**Early diagnosis:** The supply of serological tests for dengue virus and SARS-CoV-2 to diagnose cases of coinfection has been increased.

## Recommendations and conclusion

Dengue diagnosis is challenging because the symptoms are nonspecific and often can resemble those of COVID-19 or other diseases. Educational activities for the population are essential, since patients, recognizing the main symptoms and warning signs of the disease, will be able to go to the health centre for an early diagnosis.

Therefore, it is recommended to strengthen preventive measures to control the transmission of the dengue virus, the best method is to eradicate *Aedes aegypti*. Some of the actions to consider are the proper disposal of solid waste and the improvement of water storage practices.

It is also recommended to establish care protocols for the clinical management of patients in endemic areas that include a screening study for both dengue and COVID-19 in all patients with reports of fever.

Finally, the budget allocated to combat infectious diseases must be strengthened. While the budget priority in 2020 was the fight against COVID-19, resources allocated for other endemic diseases should also increase. A fixed budget should be maintained for dengue fever and ensure that regional governments execute efficiently the allocated budget.

## Contributors

Mohammad Mehedi Hasan and Mohammad Yasir Essar conceived the study. Mohammad Mehedi Hasan

designed the study. Mohammad Mehedi Hasan, Palmer José Hernández-Yépez, María de los Angeles Rivera-Cabrera, and Anusua Sarkar wrote the first draft. Ana Carla dos Santos Costa and Mohammad Mehedi Hasan edited the second draft and improved the manuscript. Mohammad Yasir Essar made the critical comments and revisions. All authors revised and approved the final draft.

**Editorial note**

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**Declaration of interests**

The authors declare that they have no competing interests.

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