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Letter to the Editor

Latin America in the clutches of an old foe: Dengue

Dear Editor,

Dengue infection is once again swarming the region of the Americas. In 2021, this region reported 1262,674 cases, including confirmed, suspected, and probable cases.[1] In 2022, after only 27 Epidemiological Weeks (EW), the number of cases skyrocketed to a staggering level of 1894,668, representing an added million to the number recorded in the same period of 2021.[1] This surge in cases is the fourth highest after the years of 2020, 2019 and 2016 when referring to the trends of the disease from 2014.[1]

A total of 2285 severe dengue cases and 796 fatalities have been reported, bearing in mind that some countries do not consistently notify the weekly number of dengue cases.[1] During the first 25 EWs of 2022, the Dengue Virus (DENV) constituted the main arbovirus detected in this region, representing 90.9% of the arboviral cases followed by Chikungunya Virus (CHIKV) and Zika Virus (ZIKV), with 8.2% and 0.9% of the reported cases respectively.[2] All four dengue serotypes are circulating in this region. In addition, some governments also found all of them co-circulating in their respective territories.[2] The annual Arbovirus Bulletin of the Pan American Health Organization pointed out that dengue transmission escalated rapidly in 2022, with a high transmission level at the beginning of the year that culminated in the 17th EW and fell afterwards when most countries enforced COVID-19 containment measures.[2]

Brazil accounted for the highest number of cases in the region, with 1716,898 reported cases thus far.[1] The DENV-1, DENV-2, and DENV-4 have ravaged Brazil leaving behind 1068 severe dengue cases and 669 deaths with a case fatality rate of 0.039.[1] These numbers can be even worse due to the depletion of the reagent used in the confirmation test of dengue, chikungunya and zika, distributed by the Brazilian Ministry of Health. It has been suggested that several factors like the heavy rainfalls the country witnessed this year and the shift towards the circulation of DENV-1 after three years to an actual dominance of DENV-2 are among the main reasons behind this widespread outbreak.[3] Furthermore, Brazil is fighting on other fronts, with other contagious diseases like coronavirus and monkeypox. Due to the COVID-19 pandemic restrictions, in the last two years, control activities to prevent vector infestation were suspended and health agents could not perform home visits to educate the population about the mosquito preventive measures. Another important factor that may be associated with the context of the pandemic is the population's fear of seeking care at a health unit. The Brazilian ministry of health directed its efforts towards addressing the new threat, which led to decreasing the resources allocated to the combat against dengue. During the first three months of the current year, 63 municipalities reported community transmission of dengue for the first time.[4] It is intriguing why few southern states that used to detect local dengue transmission for the first time in 1 or 2 of their municipalities/year, are now detecting it in 10 new municipalities this year, thus further exacerbating the problem due to the limited experience in dealing with such outbreaks in these municipalities.[4]

After the 25th EW, Peru is on the brink of recording 55,000 cases, almost twice the number of dengue cases in the same period of 2021 and surpassed only by 2017′s 66,687 cases as recorded from 2014.[1] DENV-1 and DENV-2 are the circulating serotypes in the country that reported 65 fatal cases.[1] While several dengue-endemic countries saw a decline in the number of dengue cases in 2020, presumably due to the containment measures imposed to combat the COVID-19 pandemic, Peru (like Brazil) was one of the exceptions. The number of cases further increased during the first months of 2021 compared to the same time period in 2020, and the underlying factors that led to this uptick were discussed. The disruption of surveillance programs, the decreased fumigation and vector control campaigns, and the suspension of educational efforts are among the factors that might have contributed towards this outcome.[5]

With all of the 4 serotypes co-circulating in El Salvador, the country reported 9285 cases up to the 25th EW.[1] This is 7122 more cases compared to the same period of 2021 and the highest since 2014.[1] The surge of cases during this period of the year is hardly surprising given the rainy and humid climate of the country between May and October, which result in a probable increase in the number of the dengue-spreading *Aedes* mosquitos. The Government has taken several actions to counteract the disease. The Ministry of Health mobilized teams to eradicate mosquito sites, trace cases, carry out fumigation and conduct inspections on a daily basis. Earlier in January, the government launched a multisectoral campaign

that aimed at controlling the vectors of arboviruses, through deploying personnel across the country with the task of combating the vector, destroying breeding sites and raising awareness about the disease.

Colombia's 26th EW report brought 13,701 more cases than the number reported in the same period in 2021, with an overall of 30,699 cases, which is still lower than the number recorded in 2020 and 2019 when it surpassed 55,000 cases.[1] Nicaragua recorded 22,887 cases after 26 EWs, hardly different from 2021 ($n = 22,124$) and even lower than 2020 and 2019.[1] The same applies to Mexico, where 12,842 cases have been reported with no significant increase from year to year and with a decrease in comparison to prior years.[1] Whereas the number of dengue cases in Ecuador (11,897 cases after 26 EWs) is lower than the numbers reported in 2021 (14,499) and slightly above the numbers reported in 2020 (11,799) during the same period.[1]

Ascribing the spike of dengue cases in Brazil, Peru, El Salvador, Colombia, and other countries to one reason is a huge mistake. A broad spectrum of factors should be carefully considered before rushing into conclusions. The high temperature, humidity, and rainy weathers, the introduction of serotypes that are originally less common to some countries, the impact of COVID-19 containment measures, the disruption of dengue surveillance and vector control programs in the post-COVID-19 era, the fact that the healthcare workers have been and are still up to this moment overwhelmed by the COVID-19 menace, the climate change and the political instability hampering control efforts could have all affected the neglected tropical disease in one way or another. This outbreak and the paralleled outbreak in Southeast Asia make it evident that all potential factors should be further studied, while reinitiating rigorous vector control programs, launching awareness campaigns, supporting the efforts aimed at developing novel control strategies and low-cost tools for helping the correct diagnostic, and effective therapies and strengthening international collaborative efforts.

DENVAX is a live-attenuated, tetravalent vaccine manufactured by the Japan-based drug company, Takeda. This vaccine has been studied researched in 26 sites including Latin America where dengue is prevalent, and the vaccine is undergoing evaluation.[6] A phase 3, double-blinded, RCT with 20,099 participants, within the age group of 4–16 years showed efficacy against all 4 serotypes of the virus. However, efficacy varied significantly among the serotypes with DENV-1, 69·8% [95% CI 54·8 to 79·9]; DENV-2, 95·1% [89·9 to 97·6]; DENV-3, 48·9% [27·2 to 64·1]; DENV-4, 51·0% [−69·4 to 85·8].[7] A three-years study of the efficacy of the vaccine showed 62% efficacy against serologically confirmed dengue cases and 83.6% against hospitalized dengue cases,[8] however further research about the long-term effect of the vaccine is warranted.

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Conflict of interest

The authors declare no conflicts of interest.

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