

## Dengue during the COVID-19 pandemic

Annelies Wilder-Smith MD

### Correspondence:

Prof Annelies Wilder-Smith  
Institute of Social and Preventive Medicine,  
University of Bern, Switzerland  
anneliesws@gmail.com

Conflict of interest: none declared

Funding: none

Acknowledgements: none

### Highlight

Despite COVID-19-related disruptions in controlling dengue, efforts need to be maintained to prevent vector-borne diseases during this pandemic. Although travel restrictions brought a global halt to mobility and therefore also a substantial decline of imported and travel-associated dengue, dengue will become dominant again in travel medicine as soon as international travel resumes.

© International Society of Travel Medicine 2021. Published by Oxford University Press. All rights reserved. For Permissions, please e-mail: journals.permissions@oup.com

Although dengue has never been declared a public health emergency of international concern, dengue is by far the most frequent arboviral disease in the tropical and sub-tropical regions of the world poised to increase in intensity and geographic range. This issue of the *Journal of Travel Medicine* highlights that dengue is the only arboviral disease which has seen a consistent increase over the past two decades, even exceeding malaria in all continents except for Africa. The global, regional, and national burden of dengue from 1990 to 2019 based on the findings from the Global Burden of Diseases Study 2019 showed that those under the age of 5 years, once accounting for the largest portion of deaths in 1990, were overtaken by those aged 15-49 years old in 2019.<sup>1</sup> Age standardized incidence, deaths, and DALY rates accelerated most among high-middle and high socio-demographic index regions. Southeast Asia and South Asia had most of the dengue incident cases, deaths and DALYs, but East Asia saw the fastest rise. Global land-ocean temperature index and air passenger travel metrics were found to be remarkably correlated with dengue burden amidst urbanization, warming climates and increased human mobility in much of the world.

Dengue is also the most frequent arboviral disease encountered in travellers presenting to GeoSentinel sites, with increasing trends over the past two decades. In Southeast Asia, annual proportionate morbidity increased from 50 dengue cases per 1000 ill returned travellers in non-epidemic years to an average of 159 cases per 1000 travellers during epidemic years.<sup>2</sup> According to a predictive time series analysis from Spain, based on dengue virus importations via travellers, a continuing increase in imported dengue incidence can be expected in the near future, which, in the worst case scenario would mean an increase of 65% by 2025.<sup>3</sup> Dengue is now also occurring in places that typically do not see much dengue. In Nepal, an autochthonous outbreak was unmasked via international trekkers<sup>4</sup>; in Senegal, a dengue outbreak exploded during the Grand Magal pilgrimage<sup>5</sup>; and Australia is experiencing a greater geographic range vulnerable to autochthonous dengue transmission.<sup>6</sup> This issue of the *Journal of Travel Medicine* also reports that in August 2020, in the shadow of the COVID-19 pandemic, an autochthonous dengue outbreak occurred in Italy, following importation via a traveller from Indonesia, the second dengue outbreak in Italy in the past two decades.<sup>7</sup> Epidemiological investigation identified further five autochthonous dengue cases among people who lived or stayed near the residence of the imported case. Entomological site inspection identified a high density of *Aedes albopictus* mosquitoes, which sustained local dengue virus transmission.

Dengue-endemic areas have faced the additional public health and socio-economic impact of the ongoing coronavirus disease 2019 (COVID-19) pandemic. COVID-19 and dengue co-infections have

been reported in endemic populations<sup>8</sup> and travellers<sup>9</sup>, with complicated patient management and care requirements.<sup>8</sup> Although most dengue infections in travellers are primary infections known to be associated with a lower risk of severe disease outcomes, fatal outcomes in travellers have also been reported associated with primary infections.<sup>10</sup> COVID-19 and dengue co-infection was associated with severe disease and fatal outcomes, with correct and prompt diagnosis of co-infection being challenging due to the overlapping clinical and laboratory parameters.<sup>8</sup> On one hand, during a pandemic, the emphasis on COVID-19 may lead to missing other diseases both in endemic populations and in travellers. On the other hand, misdiagnosis of COVID-19 as dengue (and other infections) with failure to isolate such patients and implement appropriate contact tracing will fuel outbreaks in healthcare settings and beyond. Failing to recognize dengue and institute timely hydration may lead to preventable dengue-related deaths. High awareness of dengue and prompt laboratory diagnosis to differentiate dengue from COVID-19 is thus a priority in healthcare systems throughout the tropics and subtropics, as well as in returning travellers.

A resurgence of dengue and other arboviral diseases was thought to be a real threat during the COVID-19 pandemic because public health staff and resources for vector control were diverted to the pandemic response.<sup>11</sup> Stay-at home orders were thought to lead to decreased standards in dengue surveillance and control. Increased demand on intensive care due to COVID-19 cases could increase the death toll also for severe dengue. However, in line with the observed decline in incidence of several other infectious diseases as a result of lockdown measures<sup>12,13</sup>, a substantial decline in dengue incidence was observed in 2020 and 2021, nevertheless with considerable variation with some countries experiencing historic low levels of transmission while others are seeing record outbreaks.<sup>14</sup> Understanding the impact of lockdowns on dengue transmission is important both in how we deal with the immediate COVID-19 and dengue crisis, but also in the post-pandemic recovery period. The unique natural near-global experiment of lockdowns provides insights into dengue transmission dynamics that could be leveraged to develop better long-term control strategies.<sup>14</sup>

Despite the COVID-19-related disruption in control services for dengue, efforts need to be maintained to prevent, detect, and treat vector-borne diseases during this pandemic. Although travel restrictions brought a global halt to mobility and therefore also a substantial decline of imported and travel-associated dengue, dengue will become dominant again in travel medicine as soon as international travel resumes.

## References

1. Yang X, Quam MBM, Zhang T, Sang S. Global burden for dengue and the evolving pattern in the past 30 years. *J Travel Med* 2021.
2. Osman S, Preet R. Dengue, chikungunya and Zika in GeoSentinel surveillance of international travellers: a literature review from 1995 to 2020. *J Travel Med* 2020; **27**(8).
3. Redondo-Bravo L, Ruiz-Huerta C, Gomez-Barroso D, Sierra-Moros MJ, Benito A, Herrador Z. Imported dengue in Spain: a nationwide analysis with predictive time series analyses. *J Travel Med* 2019; **26**(8).
4. Lachish T, Lustig Y, Leshem E, et al. High incidence of dengue in Israel travelers to Kathmandu, Nepal, in 2019. *J Travel Med* 2020; **27**(1).
5. Diagne CT, Barry MA, Ba Y, Faye O, Sall AA. Dengue epidemic in Touba, Senegal: implications for the Grand Magal Pilgrimage for travellers. *J Travel Med* 2019; **26**(7).

6. Wilder-Smith A. The expanding geographic range of dengue in Australia. *Med J Aust* 2021; **215**(4): 171-2.
7. Barzon L, Gobbi F, Capelli G, et al. Autochthonous dengue outbreak in Italy 2020: Clinical, virological and entomological findings. *J Travel Med* 2021.
8. Tsheten T, Clements ACA, Gray DJ, Adhikary RK, Wangdi K. Clinical features and outcomes of COVID-19 and dengue co-infection: a systematic review. *BMC Infect Dis* 2021; **21**(1): 729.
9. Epelboin L, Blonde R, Nacher M, Combe P, Collet L. COVID-19 and dengue co-infection in a returning traveller. *J Travel Med* 2020; **27**(6).
10. Huits R, Schwartz E. Fatal outcomes of imported dengue fever in adult travelers from non-endemic areas are associated with primary infections. *J Travel Med* 2021; **28**(5).
11. Wilder-Smith A, Tissera H, Ooi EE, Coloma J, Scott TW, Gubler DJ. Preventing Dengue Epidemics during the COVID-19 Pandemic. *Am J Trop Med Hyg* 2020; **103**(2): 570-1.
12. Wu D, Liu Q, Wu T, Wang D, Lu J. The impact of COVID-19 control measures on the morbidity of varicella, herpes zoster, rubella and measles in Guangzhou, China. *Immun Inflamm Dis* 2020; **8**(4): 844-6.
13. Chan CP, Wong NS, Leung CC, Lee SS. Positive impact of measures against COVID-19 on reducing influenza in the Northern Hemisphere. *J Travel Med* 2020; **27**(8).
14. Brady O, Wilder-Smith A. What Is the Impact of Lockdowns on Dengue? *Curr Infect Dis Rep* 2021; **23**(2): 2.