

Letter to Editor

Imported viremic dengue case in a southeastern European country: Established *Aedes* mosquitoes warrant urgent surveillance

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In 2023, international tourism nearly reached the levels seen before the COVID-19 pandemic. Tropical and sub-tropical countries are a popular travel destination, where mosquito-borne diseases pose a significant public health challenge¹. Dengue, the most prominent human arboviral disease is transmitted by several species of *Aedes* mosquitoes, particularly *Aedes aegypti* and *Aedes albopictus*². These vectors are also present in Europe, especially *Aedes albopictus*, which has been recorded in most countries in Mediterranean Europe. Prompt international travel allows travelers to return while they are in their viremic phase, notably 4 to 5 days after the onset of symptoms. The mosquitoes get infected after feed on a viremic person, and consequently can transmit the virus into susceptible local population². Autochthonous dengue transmissions in Europe, where *Aedes albopictus* is the dominant vector, was reported in Veneto region in Italy, Catalonia Spain, southern France, and Adriatic coast in Croatia³. The presence of such competent vectors is progressively making dengue fever an emerging public health issue in Europe. For the first time, we report a viremic dengue fever imported into the Republic of North Macedonia.

Case 1

A 21-year-old female returned to Skopje from the Republic of Maldives on May 23, 2023, after a 10-day vacation. One day after returning she started experiencing symptoms of the disease, including, chills, fever, vomiting, sore throat, and abdominal pain. During her time in the Maldives, a local tourist guide informed her that there were confirmed cases of dengue infection within her travel group. On the fifth day after the onset of symptoms, the patient was admitted to the University Clinic for Infectious Diseases in Skopje due to persistent fever and appearance of a rash on her face and trunk. During physical examination the patient was vitally stable and oriented. The skin examination revealed a maculopapular rash on her face, trunk, and both upper and lower extremities.

The tourniquet test was negative. Other systemic examinations did not reveal any notable findings. Biochemical analysis demonstrated mild leukopenia, thrombocytopenia and moderate elevation of aminotransferases. Serological analysis detected positive results for dengue-specific IgM antibodies through an immunofluorescence test. Serology results for Zika, chikungunya, Epstein-Barr virus (EBV), Cytomegalovirus (CMV), and Human immunodeficiency virus (HIV) were negative. The case was confirmed using reverse transcription-polymerase chain reaction (RT-PCR). The hospital stay proceeded without complications, and the patient was discharged in a good condition.

Republic of North Macedonia is a landlocked country in southeastern Europe, and its capital Skopje represents the country's main travel center. The first detection of *Aedes albopictus* in North Macedonia was in 2017, near the border with Greece⁴. In 2020, a report confirmed the presence of an established population of *Aedes albopictus* in Skopje⁴, and initial detection occurred in close proximity of the main bus and railway station. The introduction of *Aedes albopictus* in Skopje is hypothesized to be primarily linked to human activities, particularly transportation⁴.

Global warming contributes to favorable conditions for the spread of *Aedes albopictus*. Rising temperatures, increased rainfall, and the presence of small reservoirs foster its expansion. Current and future climate projections suggest a suitable spread of *Aedes albopictus* in the Balkans and Macedonia⁵.

The imperative for a comprehensive and coordinated surveillance strategy is emphasized in areas where established populations of *Aedes* mosquitoes are reported, due to the heightened risk of introducing and transmitting dengue fever and other emerging vector-borne diseases. This approach should encompass the monitoring of insects, ticks, and both animal and human populations to effectively address and mitigate potential threats.

Ethical statement

The patient provided written informed consent for the publication of this report. The study was approved by the Ethics Committee of the Medical Faculty in Skopje, Republic of North Macedonia.

Conflict of interest: None

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