FONDAZIONE BRUNO KESSLER
MAGAZINE

Dengue and chikungunya: Risk maps for Italy published in Nature Communications

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A new study by FBK conducted in collaboration with the Italian National Institute for Health, the Ministry of Health, and the Regions/Autonomous Provinces, has been published in the journal Nature Communications.

Although in recent years **localized outbreaks** of **autochthonous** (locally acquired) **dengue** and **chikungunya** have mainly occurred in northern and central **Italy**, the potential for new outbreaks extends to many other areas of the country. These areas are characterized by a significant presence of the mosquito vector, commonly known as the **“tiger mosquito”** (scientific name Aedes albopictus), along with favorable climatic conditions.According to the **study coordinated by Fondazione Bruno Kessler** and the National Institute for Health in partnership with the Ministry of Health and Regions/Autonomous Provinces, coastal areas and urban suburbs across the Italian peninsula are particularly suitable environments for the development of such outbreaks.

The **risk**, the authors conclude, is **widespread**, and it is advisable to increase clinical awareness of these infections, maintain high vigilance in surveillance, and strengthen awareness among those returning from places where these infections are present or endemic.

Cases of autochthonous dengue and chikungunya—diseases that were previously considered only imported—have been **increasing** in recent years across **southern Europe**. This trend is due to the resumption of international travel, the spread of vector mosquitoes, and the growing frequency of epidemics in tropical and subtropical regions.

The researchers analyzed transmission events in Italy **between 2006 and 2023**, using mathematical models to study past outbreaks and estimate transmission risk. Their analysis incorporated
population density, mosquito distribution, **and climate data**. During this period, 1,435 imported

cases of dengue and 142 of chikungunya were confirmed. Most dengue cases originated from Thailand, Cuba, India, and the Maldives, while chikungunya cases came from India, the Dominican Republic, Brazil, and Thailand. In the same time frame, **388 autochthonous cases of dengue and 93 of chikungunya** were diagnosed.

The **most favorable period** for **local transmission** following the importation of a case was **from July to the end of September**. However, in southern areas, favorable conditions can persist until November.

"All the areas where local and focal transmission of the two viruses occurred in Italy were among those identified as high-risk in our analysis," the authors write. *"However, many other areas with similar ecological conditions were also identified and could therefore be at risk if cases are imported from abroad. This highlights the need for prevention and surveillance measures to focus on areas with suitable environmental conditions, regardless of whether they have already experienced outbreaks or have yet to detect locally acquired cases."*

According to the study, **once autochthonous outbreaks were identified**, the **transmissibility** index was brought **below the epidemic threshold** within about two weeks—evidence of the effectiveness of the reactive control measures. However, delays in case detection remain a concern. *"In non-endemic regions such as Italy, it is **crucial to raise awareness about emerging vector-borne diseases**, as delayed or missed diagnoses hinder the early detection of outbreaks and reduce the chances of timely control."*

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