

# Risk assesment of vector-borne diseases outbreaks in non-endemic areas

Bruno V. Guerrero<sup>1</sup>, Vanessa Steindorf<sup>1</sup>, Rubén Blasco Aguado<sup>1</sup>,  
Luís Mateus<sup>1</sup>, Nico Stollenwerk<sup>1</sup>, and Maíra Aguiar<sup>1</sup>

<sup>1</sup>Basque Center for Applied Mathematics - BCAM, Bilbao, Spain

Mosquito-borne viruses such as dengue, Zika, chikungunya, and yellow fever are a global public health concern. Even in non-endemic Mediterranean countries like Spain, Italy, and France, there still exists a risk of disease outbreaks due to factors such as global warming, international mobility, introduction and establishment of invasive mosquitoes, and confirmed local and non-local viremic cases.

In this contribution, we present a quantitative method developed to assess the risk of outbreaks of diseases transmitted by *Aedes* mosquitoes in non-endemic areas. The proposed risk estimator is based on a modified version of the standard SIRUV compartmental model, which considers human and mosquito dynamics. The Basque Country, a region with non-autochthonous viremic cases, has been used as a case study, and the risk has been computed at a municipal and provincial level from the latest available epidemiological and entomological data. A user-friendly GIS dashboard has been developed to guide public health authorities.