



Editorial

Rising tide of Vector-Borne Diseases in Europe - Surveillance, Clinical Awareness, and Public Health Preparedness



World mosquito day 2025 and vector borne infections in Europe

The 20th August has been designated “World Mosquito Day” and the European Center for Disease Prevention and Control (ECDC) has recently summarised emerging mosquito borne infections in Europe [1]. Vector-borne diseases (VBDs) [2] are increasingly recognized as a significant threat to public health in Europe [3–7]. Over the past two decades as Europe’s summer weather get warmer and longer, arthropod vectors of a range of infectious pathogens continue to proliferate and cause much morbidity and pose an unexpected load on health services. Traditionally associated with tropical and subtropical regions, infectious diseases such as dengue, chikungunya, West Nile virus (WNV), malaria, tularemia, tick-borne encephalitis (TBE), and Crimean-Congo haemorrhagic fever (CCHF) are now increasingly reported from Europe [3–14]. These VBDs are being driven by global travel, bird and human migration, and ecological changes that favour vector establishment and continued transmission worldwide. Imported cases introduced by travellers from endemic areas can establish localized outbreaks in regions where competent vectors, particularly *Aedes* spp. and *Culex* spp. mosquitoes, are present and seasonal conditions are favourable [9,13,14]. While most outbreaks are localized and time-limited, their unpredictable nature, coupled with potential severe clinical presentations and outcomes, necessitates proactive vigilant surveillance for instance screening of blood and transplant donors, early diagnosis, treatment and prompt public health interventions [13–15]. Since the beginning of 2025, ECDC and media attention has focussed on dengue and chikungunya virus disease outbreaks that have been reported in France and Italy, where local transmission is facilitated by *Aedes albopictus* in summer months, emphasizing the risk posed by mosquito vectors combined with increasing temperatures due to climate change [3]. Since the beginning of 2025 and as of 13 August 2025 France has reported 111 cases of locally-acquired chikungunya in 22 different clusters and Italy 7 cases.

In Europe, West Nile virus and tick-borne encephalitis (TBE) are endemic, with seasonal cycles and year-on-year variation [5,7,16]. West Nile virus (WNV) remains endemic in migratory birds across southern and central Europe and continues to expand northward, exposing previously unaffected populations to infection [2,3]. Locally acquired cases were reported by Greece (n=26), France (three, of which one with unknown place of infection), Romania (three),

Bulgaria (one) and Hungary (one). In Italy alone 430 cases with 22 deaths were reported by the 28th August [16]. Most cases were among males aged 65 years and older with 100% of cases hospitalised. Thirty eight blood donors tested positive and a previous study in Italy found that 1.2% of solid organ donors were WNV positive [17].

The majority of malaria cases seen in Europe are travel related [10]. Between 2019 and 2013 there were 24,275 cases of malaria imported to Europe by travellers from sub-Saharan Africa, Asia, and South America [10]. In 2025, and as of 31 July, 12 locally acquired malaria cases have been reported in Mayotte, France, 10 of these were reported during the second half of July and two were reported in February and June. All cases reported in 2025 were due to *Plasmodium falciparum* [10].

Tick-borne infections such as Tick-borne encephalitis (TBE), Lyme borreliosis, and CCHF are increasingly reported from Europe. While these viruses are already present in many European countries, in several regions the endemicity is expanding northwards and westwards in Europe [11,18]. The tick season begins across much of Europe during warmer months between spring and autumn. In endemic areas, it affects mostly people with recreational or occupational outdoor activities such as hunting, fishing, camping, collecting mushrooms and berries, forestry, farming, military training) due to contact with infected ticks. In zones of armed conflict, such as Ukraine, TBE and other vector borne infections such as *Borrelia*, tularemia, CCHF, West Nile, leishmaniasis, and *Rickettsia prowazekii* remain under-reported due to disrupted healthcare systems, increasing the risk of undetected outbreaks [11,12,16,18,19].

Clinicians and healthcare workers must remain alert to the possibility of VBDs when evaluating patients with compatible febrile syndromes, particularly those with travel history or residing in vector-endemic regions. Early recognition, diagnostic testing, and timely reporting are critical for both individual patient care and public health surveillance [2,20–22]. Delayed recognition may result in preventable morbidity and mortality, while also undermining outbreak containment. Screening of blood and tissue donors is essential, particularly for high-risk arboviruses, to prevent transfusion-transmitted infections. Preventive measures remain cornerstone strategies against VBDs. Personal protection including insect repellents, protective clothing, and bed nets is critical. Vaccination is available for certain diseases, such as TBE and vaccines against dengue and chikungunya has been approved

[23–25], and must be prioritized in endemic areas [26]. Vector control through environmental management, larviciding, and targeted insecticide application reduces local transmission risk. Climate change adaptation, enhanced entomological surveillance, and early warning systems are essential as warming temperatures extend the seasonal activity and geographical range of vectors, facilitating autochthonous transmission of pathogens previously confined to tropical regions [10,11,18].

Europe's preparedness for VBDs varies across countries. While ECDC and WHO provide guidance and surveillance tools, gaps remain in clinician awareness, laboratory capacity, blood donor screening, and integration of ecological and climate data into predictive models [1,2,5,10,20]. Coordinated cross-border surveillance, timely public health alerts, and engagement of both human and veterinary health sectors (One Health approach) are essential to mitigate emerging risks [5,20]. The traveller dimension remains equally important. Pre-travel advice, TBE, dengue and Chikungunya vaccination in endemic regions, and malaria chemoprophylaxis must be scaled up, ensuring those moving between endemic and receptive areas are better protected. At the same time, blood and tissue safety protocols must be harmonised, with donor deferral and screening activated swiftly when arboviruses circulate. Prevention must keep pace with new vaccines and guidelines developed, and preparing rollout frameworks for new vaccines against dengue, chikungunya and malaria.

On the clinical side, guidelines for diagnosis and treatment need constant updating, with pathways to reference laboratories for confirmation. Stockpiles of essential diagnostics and therapeutics should be accessible. Preparedness must extend to outbreak response capacity, with cross-border teams and standardised vector control interventions mobilised at short notice. None of this will succeed without clear communication to the public, offering timely, practical guidance on arthropod bite avoidance, donor safety, and outbreak risks. Conflict settings require special focus. Refugee camps and war-affected zones in Europe and beyond must prioritise screening, infection prevention and control, and delousing campaigns, preventing the resurgence of typhus, scabies, and other neglected threats.

In conclusion, vector-borne diseases represent a growing and unpredictable threat to European public health. The increasing frequency of autochthonous cases of dengue, chikungunya, and West Nile virus, combined with sporadic malaria, tick-borne, and other zoonotic infections, underscores the urgent need for vigilance. Ultimately, Europe's resilience will be judged not only by its laboratories and surveillance networks but also by the vigilance of its clinicians and health-care workers. Awareness is the first line of defence: the early recognition of dengue, chikungunya, West Nile fever, malaria, tularaemia, or leishmaniasis is crucial for timely treatment and reporting. A fever in a returning traveller, a rash in a migrant worker, or encephalitis in a resident near the Danube may be the sentinel case that alerts authorities and prevents an outbreak. Healthcare workers must maintain a high index of suspicion for VBDs, particularly in febrile patients with compatible exposure histories, to enable early diagnosis, treatment, and notification for surveillance purposes. Blood and tissue safety policies must be activated rapidly and harmonised. Implementation of comprehensive prevention strategies, including vaccination, vector control, personal protection, and donor screening, together with climate-informed public health planning, will be essential to safeguard populations across Europe. Risk-based surveillance, considering the national and cross-border epidemiological and entomological situations, can strengthen preparedness and early warning for *Aedes*-borne diseases in Europe [20–22]. Europe's preparedness must shift from ad hoc outbreak response to anticipatory, climate-aware, and most importantly focus on One-Health preparedness and resilience [20,21].

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