

Fatal human West Nile Virus infections in Europe (2020-2025): a systematic review

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Background:

West Nile Virus (WNV) is one of the most frequently transmitted, arthropod-borne infections in Europe. As a result of climate change and environmental factors and the widespread proliferation of the Culex mosquito, increasing case numbers are predicted. About 80% of WNV human infections are asymptomatic but about 20% will develop febrile illness and approximately 1% will have severe neurological manifestations that may be fatal. With a systematic review, we evaluated fatal WNV cases in Europe.

Materials and Methods:

This systematic review followed PRISMA guidelines and was registered in the PROSPERO database. We searched PubMed, Embase, MEDLINE, Scopus and Cochrane databases. We searched national and ECDC reporting systems up to December 2025 for documentation on fatal WNV cases. Keywords included West Nile Virus, human, death, fatality and Europe. Two reviewers (GEB and PS) independently screened and selected studies. Data extraction and risk of bias assessment were performed.

Results:

After eliminating duplicates, a total of 305 papers were screened and 68 papers selected for data extraction and risk of bias assessment. Data extraction and analyses to date in our review process show that WNV case fatality rate varies by outbreak region and healthcare access. The reported range is approximately 4-12% of WNV hospitalized persons. Most of the WNV-related deaths occurred in the elderly or in patients with comorbidities.

Conclusion:

WNV has a complicated epidemiology and case fatality rates may be distorted by under-reporting. Mathematical models incorporating climate, surveillance and clinical data will be useful to predict infection hotspots and vulnerable populations.