

CRIMEAN-CONGO HAEMORRHAGIC FEVER REGIONAL EPIDEMIOLOGICAL CHARACTERISTICS AND PREVENTION IN THE EXPANDING RISK ZONE

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Relevance. Crimean-Congo haemorrhagic fever (CCHF) is one of the most widespread tick-borne viral haemorrhagic infections in humans. Cases of the disease are reported in more than 30 countries across Africa, Asia, the Middle East and Europe. Its primary vector and reservoir is the tick of the genus *Hyalomma*, and the distribution map of the disease largely coincides with the range of this tick. Approximately 10,000–15,000 cases are reported annually, and around 3 billion people live in at-risk areas. These figures likely underestimate the true burden of the disease: many infections are subclinical, epidemiological surveillance is patchy, and laboratory diagnosis is limited in many places.

The purpose of the study. To describe the main epidemiological patterns of CCHF and to determine which preventive measures should be taken, taking into account current data on the burden of disease and the expansion of the vector's range.

Material and methods. The analysis is based on 20 publications from 2006 to 2026: reviews, systematic reviews, meta-analyses, national surveillance data and regional studies of disease outbreaks. These cover global and European epidemiology, outbreaks in Iraq and Turkey, the expansion of the range of the genus *Hyalomma*, and prevention within the framework of the 'One Health' concept. For Turkey, national surveillance data for 2017–2024 were used.

Results and discussion. Turkey, Russia, Afghanistan, Iran and Iraq remain the best-documented endemic regions, with Turkey reporting the highest number of cases in the WHO European Region. In Turkey, 7,776 cases were recorded between 2017 and 2024; 63.8 per cent of patients were male, the mean age was 45.3 years, and the overall case fatality rate was 4.8 per cent. In Iraq, a sharp increase in incidence was observed in 2022–2023, when the outbreak affected all provinces and spread to urban areas. A study conducted in Wasit Governorate revealed a peak in confirmed cases in 2023, disease activity between April and September, and a case fatality rate of 11.5 per cent.

Case fatality rates reported in various sources vary considerably. A meta-analysis provided a pooled case fatality rate for acute infection of 11.7 per cent (95 per cent CI 9.1–14.5 per cent), whilst in some settings rates of 30–40 per cent have been reported. Case fatality rates are generally lower where surveillance systems are well-established, and Turkey provides a particularly clear illustration of this trend. One caveat should be borne in mind: the Turkish figure (4.8 per cent) covers the whole country, whereas the figure of 11.5 per cent relates to a single Iraqi province; therefore, these two figures cannot be compared directly. However, they clearly demonstrate why local data are crucial when assessing the situation and planning preventive measures.

Experience in Europe shows that the distribution of the vector and the spread of the disease are two different things. Ticks of the genus *Hyalomma* are established or have been detected at least once in 40 European countries; the virus has been recorded in 24 of these, and human cases in 22. Thus, we are observing an expansion of the risk zone, rather than an equally rapid and sustained increase in the number of clinical cases across all newly affected regions.

Several factors are associated with this expansion: climate change, changes in land use, livestock movements, bird migration and increasing human contact with grassland ecosystems. Migratory birds

can carry immature ticks of the genus *Hyalomma* over long distances, whilst trade and the cross-border movement of animals contribute to the introduction of infected ticks and new viral lineages. In other words, many of the factors determining human exposure to infection lie outside the healthcare system.

People become infected through tick bites, by crushing attached ticks, and through contact with the blood or tissues of animals with viraemia; less commonly, through the bodily fluids of infected people. Farmers, livestock breeders, slaughterhouse workers, veterinarians and healthcare workers are the groups at greatest risk, and prevention measures must address both contact with ticks and handling of potentially infectious material.

Conclusions. Our analysis shows that prevention of CCHF must simultaneously take into account two processes: the persistent burden in traditionally endemic areas and the spread of the vector into new regions. The detection of ticks in a new area does not necessarily imply a sustained rise in human case numbers, but it does indicate that the likelihood of new human cases emerging in regions previously considered low-risk—particularly in Europe—is increasing, and preparedness for this must be ensured. As there is no licensed vaccine or specific treatment, the priorities are:

- coordinated surveillance within the ‘One Health’ framework, bringing together public health, veterinary and environmental protection services;
- early diagnosis, with a readiness to detect cases in both endemic and recently affected regions;
- protection of workers handling ticks, animals, animal tissues or infected patients;
- vector control tailored to the local climate and seasonal patterns of infection risk.