

## Current situation of human vector-borne diseases in European wildlife

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Several human diseases originate from wildlife, and some of them are of major public health importance. Wildlife may act as a reservoir of human pathogens as shown in the last decades with the emergence of Nipah or SARS diseases in Asia involving bats as reservoirs or the re-emergence of West Nile fever (WNF) or Crimean-Congo Hemorrhagic fever (CCHF) in Europe. Human diseases originating from wildlife can be divided in two groups: diseases contracted by humans by direct or indirect (excreta) contact with wild animals and diseases transmitted to humans by an arthropod vector as mosquito, tick or biting midge previously infected from wildlife (arthropod-borne diseases). Transmission of pathogens from wildlife to domestic animals and then humans may also occur.

A coordinated approach for vector-borne disease surveillance, prevention and control in Europe was initiated to identify potential threats for humans by the European Centre for Disease Prevention and Control (ECDC), which is in charge of risk assessment of communicable diseases. ECDC provides financial support to an European network of laboratories for emerging viral diseases (ENIVD) for an early detection of human pathogens and a network of medical entomologists (VBORNET) which provides information about the present distribution of arthropod vectors and surveillance activities undertaken in Europe. In addition, ECDC initiated collaboration with the European Agency for Food Safety regarding risks linked to wildlife.

Prevention and control of human diseases originating from wildlife require a multi-disciplinary approach to understand the mechanisms of transmission of pathogens and determine predictive indicators of potential (re)emergence of pathogens. Environmental and human behavior changes can increase the human-wildlife interface and the risk of transmission of pathogens. Surveillance of absence or presence or variations of incidence of pathogens in wild animals would be appropriate to better define the potential risks of transmission to humans.

Currently several vector-borne diseases are under surveillance in Europe but most of these disease are reported under passive surveillance and information provided by the Member States are published in epidemiological reports. Other diseases are under more active surveillance such as WNF or CCHF with an early reporting information system of human cases. Surveillance of wildlife involved in the maintenance of these viruses *in natura* (birds for WNF virus, lagomorphs, rodents or birds for CCHF virus) is difficult. Detection of presence of virus in arthropods (mosquitoes for WNF, ticks for CCHF) can be performed but cost-effectiveness and sustainability are questionable. The use of sentinel birds for WNF or domestic ungulates for CCHF can be an alternative to monitor active transmission in areas where competent arthropod vectors are present. Hantaviruses which cause hemorrhagic fever with renal syndrome in humans are transmitted by rodents *Apodemus* and *Myodes* sp. Monitoring of rodent population dynamics and hantavirus excretion may provide useful information about any increasing risk of transmission to humans but this is not used for an early warning system.

In Europe several studies of wildlife to detect the distribution of pathogens of human importance are undertaken. Other projects e.g. the EDENext FP7 project - *Biology and Control of vector-borne infections in Europe* will provide the understanding and modelling the mechanisms of introduction, establishment, and spread of vectors and human vector-borne diseases, and the improvement of intervention and control strategies for vector populations for the benefit of partners such as human and veterinary public health agencies and other groups involved in risk assessment, control and prevention.