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DOGS AS SENTINELS FOR WEST NILE VIRUS? IASI, ROMANIA EXPOSURE

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Abstract

West Nile virus (WNV) is an important zoonotic flavivirus responsible for mild fever to severe, lethal neuroinvasive disease in humans, horses, birds, and other wildlife species. Since its discovery, WNV has caused multiple human and animal disease outbreaks in all continents, except Antarctica. Infections are associated with economic losses, mainly due to the cost of treatment of infected patients, control programmes, and loss of animals and animal products. This cross-sectional study explored the feasibility of domestic dogs as sentinels to better understand risks of mosquito-borne diseases in Iasi city.

Keywords: virus, zoonotic, WNV, sentinels

INTRODUCTION

The One Health Commission defines One Health as "the collaborative effort of multiple health-science professions, together with their related disciplines and institutions—working locally, nationally, and globally—to attain optimal health for people, domestic animals, wildlife, plants, and our environment" [1]. The focus of One Health research and activities has largely stemmed from zoonotic disease activities and prediction of pathogen emergence at the animal–human interface, such as avian influenza and severe acute respiratory syndrome (SARS); however, the multifaceted and wide-approach scope of this concept extends to "megaconcerns", such as food security, food safety, antimicrobial resistance, and climate change, as well as the human–animal bond and socioeconomic fields [2,3]. While the One Health concept has attracted interest across veterinary, medical, conservation, and socioeconomic domains, concerns have been raised over the lack of governance in global health issues, and the difficulties of breaking down the siloed approach to health and translating ideas into action, particularly in developing countries [4–6]. Sentinel surveillance can provide a useful framework for enhancing collaboration across sectors. Sentinel surveillance involves surveillance of targeted subpopulation(s), which may improve both detection of disease and cost effectiveness [13]. In simple terms, a sentinel may be defined as "an indicator of the presence of disease" [14]. Animals may be used as sentinels for various health risks, and a classic example would be 'the canary in a coal mine' [15].

Several positive attributes of the domestic dog (*Canis familiaris*) have been described in the context of utilizing them as sentinels for human disease. In many countries they are ubiquitous, with free-roaming and scavenging lifestyles, thus exposing them to multiple pathogens and making them an ideal "sampling tool" [20].

The West Nile virus was the most described viral pathogen, with eight references whose publication dates were in the range of 2001–2017. Countries of data collection were Canada (1), China (1), USA (3), Morocco (1), and Senegal (1) as individual studies, and one study compared data from France, Chad, Djibouti, Senegal, Côte d'Ivoire, Republic of the Congo, and Gabon [30].

MATERIAL AND METHODS

We tested blood samples from 97 dogs (predominantly mixted breeds) coming from

Iasi, Romania region. All plasma samples were tested for the presence of anti- antibodies by ELISA (ID Screen® West Nile Competition species). Out of 97 plasma samples, 28 were found positive by ELISA, which means 28,8%. All this positive samples will be confirmed by seroneutralisation reaction.

RESULTS AND DISCUSSIONS

Our preliminary results confirmed the dogs infection with flavivirus.

Translating the theoretical idea of sentinel surveillance into a feasible and practical surveillance system requires examination of several factors. Firstly, the objective of the surveillance must be clear; for example, whether the objective is to measure frequency of disease or to provide a warning of disease emergence or expansion will determine which regions and dog populations will be most useful. The region(s) should be selected based on known or estimated prevalence of disease, or presence or risk of vector emergence, and sentinel units (e.g., veterinary clinics, shelters, and laboratories) selected to maximize the included population. Dog populations utilized would depend on the specific pathogen of concern and might include live sampling of dogs or the use of samples already taken for other diagnostic tests. Sampling strategy would be formed based on the objective of the study as well. For example, if the objective is to detect a new wave of viral transmission, then repeatedly testing naive juvenile dogs would provide an ideal sample, whereas, if measuring prevalence of a rare disease, dogs at high risk for exposure should be selected. The selected dog populations should be based on their availability for sampling, increased susceptibility to the pathogen in question, relationship to the pathogen and human population they are to represent, and the number of dogs available to sample. It is also important to note that, when samples represent a subset of clinically ill dogs, measured prevalence cannot be used to estimate regional prevalence.

CONCLUSIONS

Different studies suggests that the dogs can be a sentinel for West Nile virus infection but in our study, we can't conclude yet. These preliminary results have to completed with confirmation of the positives samples by seroneutralisation reaction and the human seroprevalence of West Nile virus in the Iasi region. We will use the same methods for human samples who are already collected.

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