Annals of Translational Medicine & Epidemiology

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Austin Publishing Group

Special Article - Tick Epidemiology

The Influence of Wildlife in Spreading of Tick-Borne Pathogens to Domestic Animals

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Received: April 12, 2018; **Accepted:** April 21, 2018; **Published:** April 27, 2018

Short Communication

Ticks (Acari: Ixodidae) are vectors of wide variety pathogens including viruses, bacteria, and protozoa, which are transferred to vertebrates. The most common tick in northern Europe is Ixodes ricinus, which is known as a vector of a wide range of pathogens of medical and veterinary importance. Tick-borne pathogens are supposed to be answerable for more than 100,000 cases of disease in humans in the world. In the United States ticks are responsible for nearly 95% of the vector-borne diseases reported annually [1]. Ticks are recognized as second worldwide (after mosquitoes) vectors of human diseases, but they are the most important vectors of disease-causing pathogens in companion and wild animals [2].

The most of tick-borne diseases are zoonoses, thus domestic and wildlife take a role as reservoir hosts, amplifying hosts or sentinels for human infections [3]. For these reasons, the detection and species identification of pathogens in ticks collected from animals is essential to analyze their occurrence, emergence and spread, in view of protecting humans and animals as well [4]. New molecular technologies significantly advanced the study of ticks and tick-borne diseases and newly developed diagnostic assays have improved the efficacy and accurateness for identifying tick-borne pathogen. These technologies increase our evaluation and understanding of ticks and tick-borne agents molecular biology, systematics, ecology, epidemiology and evolution, which in turn impact on the development of risk responsiveness and control measures.

Wild vertebrates are involved in the transmission cycles of numerous tick-borne pathogens, also can affect the abundance of arthropod vectors and be responsible to spread to domestic animals. The increased risks associated with ticks and tick-borne pathogens are supported by expansion of tick populations into new areas and by some changes in social habits, causing increase in contact between humans and ticks [5,6]. Climate and landscape changes, urbanization, and the adaptation of vectors and wildlife to human habitats cause states, which affect the interface of vector, wildlife and human populations, frequently with a consequent increase in zoonotic risk. Certain tick-borne infections have recently stayed emerging in new regions or re-emerging within endemic locations and create an increasing alarm for public health, food security, and biodiversity protection [7]. Especially global warming, what can also affect arthropod vector concentration, has a direct influence on the abundance, geographical distribution and vectorial ability of arthropod vectors [8]. Over the last few decades, the world has witnessed radical changes in climate and ecosystems. These events, together with other factors such as increasing illegal wildlife trade and changing human behaviour towards wildlife, are resulting into thinning boundaries between wild canids and felids and their domestic counterparts. As a consequence, the epidemiology of diseases caused by a number of infectious agents is undergoing profound readjustments, as pathogens adapt to new hosts and environments [9]. These strong changes present new and increasing severe public health threats to humans, livestock and companion animals in areas where they were previously unknown or were considered to be of minor importance, what is emphasized by Sonenshine [10]. Therefore, there is a risk for diseases of wildlife to spread to domestic carnivores and vice versa, and for zoonotic agents to emerge or re-emerge in human populations. Hence, the identification of the hazards arising from the co-habitation of these species is critical in order to plan and develop adequate control strategies against these pathogens. Progress studies should be led to better illustrate genetically and phenotypically the recognized novel agents, both in what regards their potential pathogenicity to vertebrates, and to help the application of effective control strategies for the controlling of ticks and humans and animal tick-borne pathogens [11].

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Citation: Skotarczak B. The Influence of Wildlife in Spreading of Tick-Borne Pathogens to Domestic Animals. Ann Transl Med Epidemiol. 2018; 5(1): 1014.

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Ann Transl Med Epidemiol - Volume 5 Issue 1 - 2018
ISSN: 2472-3649 | www.austinpublishinggroup.com

Citation: Skotarczak B. The Influence of Wildlife in Spreading of Tick-Borne Pathogens to Domestic Animals. Ann Transl Med Epidemiol. 2018; 5(1): 1014.