



Editorial

# Dealing With *Angiostrongylus* as a Priority Within One Health Perspective

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The global impacts of emerging and endemic zoonoses on both animal and human populations make it vital to foster collaboration among health sectors. Using a multisectoral One Health approach is a critical step toward improving both animal and human health.

Parasitic worm infections rank among the most prevalent and underestimated infections in humans and animals. Most emerging infectious diseases are zoonotic in nature, which means they affect humans and at least one other vertebrate species. Human angiostrongyliasis, caused by *Angiostrongylus cantonensis* and *Angiostrongylus costaricensis*, is an important foodborne zoonosis, for which humans are accidental hosts. The natural life cycle of these parasitic nematodes involves transmission between vertebrates, mainly rodents (the definitive hosts) and terrestrial or freshwater mollusks (the intermediate hosts). Human infection is usually the result of eating a raw or undercooked host species, predominantly mollusks, as well as lizards, frogs, crustaceans, centipedes, and fish. *A. cantonensis* is primarily associated with eosinophilic meningitis (neuroangiostrongyliasis), whereas *A. costaricensis* is linked with abdominal angiostrongyliasis, both of which are difficult to treat.

Recent data suggest that these nematodes have expanded their geographical range, resulting in a rapidly increasing incidence of human infections (1). *A. cantonensis* was first described in rodents in China in 1935, and the first human infection was reported in Taiwan in 1945. For decades, endemic areas for *A. cantonensis* were limited to Asia and the islands of the Pacific, but this parasite has spread to new territories at an alarming rate and has been reported in more than 30 countries throughout Africa, the Americas, the Caribbean, Australia, and Europe (1,2).

As for *A. costaricensis*, this nematode was first described in Costa Rica about 50 years ago and, since then, it has been reported in more than 20 countries in the Americas and the Caribbean. It has appeared either in rodent hosts,

## Author's Biosketch

Dr. Josué de Moraes is a Professor of Parasitology and Infectious Diseases at Guarulhos University, where he is also the head of the Research Center for Neglected Diseases. He completed his Ph.D. at the University of São Paulo and received the 2011 Institutional Award for Excellence in Science as well as the best national Ph.D.



thesis award in the field of Biotechnology. Dr. de Moraes is an evaluator of grant applications for several research organizations. He serves as editor or editorial board member of a number of journals and is a member of several scientific societies. J. de Moraes has published over 100 papers on different subjects related to neglected diseases (leishmaniasis, Chagas diseases, amoebiasis, toxocarosis, angiostrongyliasis, and mainly schistosomiasis). His research interest is antiparasitic drug discovery, with particular emphasis on anthelmintics.

causing diseases in humans, or gastropod hosts (3). Its high incidence emphasizes the importance and urgency of developing strategies to reduce the emergence of zoonotic pathogens.

In addition to the reduction of their emergence, the diagnosis and clinical management of these infections are of great importance. Most notably, the control of angiostrongyliasis is often difficult because it involves disrupting a complex transmission chain, involving many hosts that interact in a constantly changing environment. Moreover, there is no consensus on the appropriate treatment for angiostrongyliasis, which highlights the urgency of finding novel anthelmintic agents (4). Indeed, this issue affects other helminth infections as well (5,6).

Considering the large home range of hosts, some animals may serve as sentinels. For example, hedgehogs and tawny frogmouths have been used as sentinels for early detection and understanding of the dynamics of



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*A. cantonensis* transmission in Europe and Australia, respectively (7,8). Canine angiostrongylosis cases have also been reported in Australia, where it has been suggested that dogs may serve as sentinels (9). Interestingly, veterinarians are not only being made aware of risk factors but have also been recommended to advise clients of preventive treatment when dogs are suspected of canine neural angiostrongylosis.

The One Health approach brings together animal, human, and environmental health experts to solve some of the problems in the field of infectious diseases. Since angiostrongylosis transmission is a dynamic process and involves many interlinked factors, surveillance of angiostrongylosis in animals represents a key tool for fulfilling One Health principles and preventing the spread of diseases among humans. It is also essential to remember that the stronger the perception of risk arising from an illness, the more likely it is that people will adopt behaviors that reduce that risk. Therefore, continued outreach efforts, including public education programs, forums, and publication of clinical guidelines, may contribute to the success of disease surveillance and control, as performed in Hawaii, United States (10).

The growth of the human population, its increasing global movement, the globalization of the food trade, the changes in wildlife habitats, and climate change issues have all revealed the interaction of animal and human health with the environment. In this context, understanding the threat of angiostrongylosis is crucial; therefore, there is an urgent need to increase awareness of this and other parasitic infections. Additionally, implementing public health programs in the region through the One Health approach is strongly recommended.

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#### Conflict of Interests

None.

#### Ethical Issues

Not applicable.

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