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Short Communication

Leptospirosis and "One Health" The Importance of Multisectoral Collaboration

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Abstract

The concept of "One Health" starts from the awareness of the important possibilities that exist to protect public health through policies aimed at preventing and controlling the pathogens present in animal populations, acting at the interface between people, animals and the environment. Controlling zoonotic pathogens at their animal source is the most effective and economic way of protecting people. A "One Health" approach to leptospirosis control is essential because human infection almost invariably results either from direct animal exposure or from contaminated environments. Leptospirosis is a zoonosis of worldwide distribution. It is to be controlled because it is extremely difficult to eradicate. The prevention of animal leptospirosis directly impacts the incidence/prevalence of the human disease. The main control measures in veterinary medicine are vaccination, hygienic-sanitary measures and epidemiological surveillance. Veterinary Services, in both their public and private components, play an essential role in the development and implementation of policies to manage animal health risks. In conclusion, the control of zoonoses requires the joint work of several sectors, which involve human and animal public health, contemplating the care of the environment.

The 'One Health' concept is founded on an awareness of the major opportunities that exist to protect public health through policies aimed at preventing and controlling pathogens within animal populations, at the interface between humans, animals and the environment. This concept is envisaged and implemented by the OIE (World Organization of Animal Health) as a collaborative global approach to understand risks for human and animal health (including both domestic animals and wildlife) and ecosystem as a whole [1].

Controlling zoonotic pathogens at their animal source – that is, pathogens that can be transmitted from animals to humans and vice versa – is the most effective and economic way of protecting humans. Consequently, global strategies to prevent and control pathogens must be developed if we are to protect the public health. These should be coordinated at the human–animal–ecosystems interface and applied at the national, regional and global levels, through the implementation of appropriate policies [2].

Veterinary Public Health (VPH) is defined as "The contributions to the physical, mental and social well-being of humans through an understanding and application of veterinary science" [WHO/FAO/OIE definition 1999]. Human health, animal husbandry and animal health are closely connected and VPH is a fundamental part of public health whereby human health and well-being are the main objectives. VPH is multidisciplinary and contributes to many areas of public health that are not always related to animals. In order to integrate veterinary public health into the goals of public health, it is essential to improve collaboration between human and veterinary medical science, environmental science and other related fields - in accordance with 'one health' principles [3]

A One Health approach to leptospirosis control is essential because human infection almost invariably results either from direct animal exposure or from exposure to environments contaminated by infected animals [4].

The term leptospirosis represents a spectrum of human and veterinary diseases caused by pathogenic serovars of the spirochaete genus Leptospira [4].

Leptospirosis is a zoonosis of worldwide distribution, endemic mainly in countries with humid subtropical or tropical climates and has epidemic potential. It often peaks seasonally, sometimes in outbreaks, and is often linked to climate changes, poor urban slum communities, occupation and to recreational activities. The clinical course in humans ranges from mild to lethal with a broad spectrum of symptoms and clinical signs. Leptospirosis is underreported in many countries because of difficult clinical diagnosis and the lack of diagnostic laboratory services [5].

The disease situation in the developing economies presents a major challenge as humans and animals frequently live in close association [6].

Leptospirosis is a zoonosis to be controlled because it is extremely difficult to eradicate. The disease is kept mainly in wild reservoirs that act as carriers.

Animal leptospirosis is fundamentally different from human leptospirosis in important aspects of epidemiology, pathogenesis, clinical features, requirements of diagnostic methods used and the control measures applied. It is characterized by the acute clinical features seen in human disease, but also chronic infection which can result in important economic losses due to reproductive wastage [6].

Leptospirosis in humans is acquired from an animal source; the transmission from human to human is practically non-existent. Pathogenic leptospires live in the proximal renal tubules of the carriers' kidneys. Therefore the urine of infected animals is the main source of infection. However, it must be considered that other tissues and organs can also be sources of infection. From the kidneys, leptospires are excreted in urine and may then contaminate soil, surface water, streams and rivers. Infections of animals or humans occur from direct contact with urine or indirectly from contaminated water. The carriers may be wild or domestic animals, especially rodents and small marsupials, cattle, pigs and dogs. Almost every mammal (including aquatic mammals) and marsupial worldwide has been shown to be carriers of leptospires [7].

The prevention of animal leptospirosis directly impacts the incidence / prevalence of the human disease.

The main control measures in veterinary medicine are vaccination, hygienic-sanitary measures and epidemiological surveillance.

THE BEST METHOD OF PREVENTION IS A SYSTEMATIC VACCINATION

Vaccines against leptospirosis followed within a year of the first isolation of Leptospira, with the first use of a killed whole cell bacterin vaccine in guinea pigs published in 1916 (Ido et al. 1916). Since then, bacterin vaccines have been used in humans, cattle, swine, and dogs and remain the only vaccines licensed at the present time. The immunity elicited is restricted to serovars with related lipopolysaccharide (LPS) antigen. Likewise, vaccines based on LPS antigens have clearly demonstrated protection in animal models, which is also at best serogroup specific [8].

There is a variety of vaccines containing different serovars of Leptospira, combined or not with viral and / or bacterial agents. The serovars used in the formulation always has to be local It is important that each country or region is able to isolate and typify leptospires in order to know the local serovars. In theory any parasitic Leptospira may infect any animal species. Fortunately, only a small number of serovars is endemic in any particular region or country [6].

To guarantee the quality of the biologics, all the series of vaccines that are commercialized in Argentina, the National Service of Animal Health (SENASA) carried out the quality controls of each of series produced or imported. This control included: sterility, safety, inactivation, pH and efficacy in hamsters.

During 2016-2017 SENASA Leptospirosis Department had controlled 282 leptospirosis vaccines series: nationals and imported, bovine, ovine, swine and canine vaccines (244 were approved and commercialized).

Measures for occupational hygiene such as protective clothing (gloves, boots, for example) and avoidance of splash from urine or water are often useful but hard to implement because they impede work or are unacceptable to both workers and employers [7].

Rodents were first to be recognized carriers of leptospires. They are often incriminated as the source of infection to human beings [9]. Therefore a very important prevention measure is the control of rodent populations.

Surveillance and reporting of leptospirosis vary significantly from country to country, depending on the surveillance capacity, whether reporting of the disease is mandatory, and whether the necessary laboratory infrastructure is available to perform the standard, but technically demanding, diagnosis. There is a need to develop integrated disease, ecology, and risk model approaches and to establish standardized protocols and centers of excellence for clinical, epidemiological and laboratory studies [10].

SENASA carries out epidemiological monitoring programs both in domestic and wild animals. Samples obtained from these animals are analyzed by the MAT/ isolation following the guideliness of the OIE Terrestrial Manual.

Veterinary Services, in both their public and private components, play an essential role in the development and implementation of policies to manage animal health risks [2].

In conclusion, the control of zoonoses requires the joint work of several sectors, which involve human and animal public health contemplating the care of the environment. The support of governments is essential to improve public health and animal health worldwide.

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