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WVA Position on Leishmaniasis

BACKGROUND:

Leishmaniasis is a neglected tropical disease, found in approximately 98 countries on 5 continents.¹ It is caused by *Leishmania* parasites, protozoans which are most commonly spread by the bite of infected phlebotomine sand flies. The disease has several forms ranging from cutaneous leishmaniasis, which causes skin lesions, to visceral leishmaniasis, which affects internal organs and is generally fatal if not treated. Approximately 12 million people are infected with *Leishmania* at any given time,¹ with an estimated 700,000 to 1 million new cases occurring annually. Rodents and canids are the most common reservoir hosts.² In endemic countries, though cats may act as hosts,³ dogs are considered the primary reservoir host for sand fly transmitted *Leishmania infantum* (*L. infantum*), the main agent of canine leishmaniasis (CanL) and an important agent in human leishmaniasis.⁴ Geographically distant rehoming of dogs can lead to the introduction of the disease into new populations.⁵

Diagnosing CanL can be difficult since up to half of infected dogs are asymptomatic for up to seven years before the onset of clinical signs.⁶ Cytology from skin impressions, Giemsa-or Diff-Quick stained joint fluid, lymph nodes or bone marrow aspirates may be rewarding, as can histopathology of infected skin or organs by identifying parasites within tissue macrophages. The sensitivity of parasite detection is lower with skin biopsies and is generally reduced in clinically healthy infected dogs, but can be increased by molecular or immunohistochemical techniques.⁵ Quantitative serology is useful, especially when compatible clinical signs are present.⁷ The specific antibody response usually first occurs 12 weeks after initial infection but can extend to years even if the infection is subclinical.⁵ Detection of parasite-specific DNA by PCR allows sensitive and specific diagnosis of infection.

¹ Leishmaniasis Fact Sheet, World Health Organization, 2 March 2020, <https://www.who.int/news-room/fact-sheets/detail/leishmaniasis> (accessed September 21, 2020)

² E. K. Saliba and O. Y. Oumeish, "Reservoir hosts of cutaneous leishmaniasis," *Clinics in Dermatology*, vol. 17, no. 3, pp. 275–277, 1999.

³ ESCCAP Guideline 05 Third Ed., March 2019. ISBN: 978-1-907259-69-2

⁴ Gramiccia M. Recent advances in leishmaniasis in pet animals: epidemiology, diagnostics and anti-vectorial prophylaxis. *Vet Parasitol.* 2011;181(1):23-30. doi:10.1016/j.vetpar.2011.04.019

⁵ Wright, I et al. (2020) Parasites and vector-borne diseases disseminated by rehomed dogs. *Parasites & Vectors* 13, 546 (pages 1-4). <https://doi.org/10.1186/s13071-020-04407-5>

⁶ Mancianti F, Gramiccia M, Gradoni L, Pieri S. Studies on canine leishmaniasis control. 1. Evolution of infection of different clinical forms of canine leishmaniasis following antimonial treatment. *Trans R Soc Trop Med Hyg.* 1988;82(4):566-567. doi:10.1016/0035-9203(88)90510-x

⁷ Solano-Gallego L, Villanueva-Saz S, Carbonell M, Trotta M, Furlanello T, Natale A. Serological diagnosis of canine leishmaniasis: comparison of three commercial ELISA tests (Leiscan, ID Screen and Leishmania 96), a rapid test (Speed Leish K) and an in-house IFAT. *Parasit Vectors.* 2014;7:111. Published 2014 Mar 24. doi:10.1186/1756-3305-7-111

Unfortunately, treatment with allopurinol in combination with N-methylglucamine antimoniate or miltefosine often only temporarily improves clinical signs in dogs and does not eliminate the parasites.⁸ Treated dogs will remain carriers of infection and may relapse. Vaccination, combined with the use of repellent topical insecticides, is the most effective form of prevention and control of leishmaniasis.⁹ Commercial vaccines labelled for use against canine leishmaniasis are available in Europe and Brazil, and other vaccines are being developed.¹⁰ Specific repellent topical insecticides, such as deltamethrin or imidacloprid/flumethrin-impregnated collars reduce the incidence of CanL by 52 and 90%, respectively.¹¹ Spot-on formulations, such as permethrin and imidacloprid, reduce sandfly bites and disease transmission. To prevent reinfection and reduce the risk of zoonotic spread, topical insecticides should be regularly applied and infected dogs should be continuously monitored by veterinarians.

Importantly, no evidence culling seropositive dogs reduces the incidence of leishmaniasis in humans¹², and programs that have utilized that method to control the disease have failed.^{13, 14} In contrast, programs aimed at prevention through vaccination of dogs led to a reduction in the incidence of leishmaniasis in both canines and humans.¹⁵ Vaccination against *Leishmania*, combined with regular use of topical insecticides, is undoubtedly the most effective form of prevention and control of leishmaniasis.¹⁶

WVA POSITION:

Veterinarians and veterinary paraprofessionals have key roles in mitigating and eliminating the public health risks of leishmaniasis. Where geographically distant relocation is occurring, veterinary professionals should perform thorough examinations with the necessary diagnostics to prevent inadvertent pathogen spread. Research strongly supports the use of vaccination instead of culling to prevent the spread of leishmaniasis. Veterinarians, particularly those in endemic regions, should advocate for use of animal vaccines, where available, to control and prevent leishmaniasis and educate clients on the importance of regular use of repellent topical insecticides in preventing vector-borne transmission. All public health personnel should advocate for the implementation of leishmaniasis prevention programs centred around interrupting disease transmission and preventing infections in reservoir hosts.

WVA RECOMMENDATIONS:

1. Leishmaniasis prevention programs are a One Health effort that should focus on disrupting the transmission of infection and preventing canine infection at the population level to protect animal and human health.
2. Protective insecticides should be utilized for dogs in *Leishmania*-endemic areas, dogs travelling to sites of infection, and infected dogs (to reduce potential transmission).

⁸ Baneth G, Shaw SE. Chemotherapy of canine leishmaniasis. *Vet Parasitol.* 2002;106(4):315-324. doi:10.1016/s0304-4017(02)00115-2

⁹ Ribeiro RR, Michalick MSM, da Silva ME, Dos Santos CCP, Frézard FJG, da Silva SM. Canine Leishmaniasis: An Overview of the Current Status and Strategies for Control. *Biomed Res Int.* 2018;2018:3296893. Published 2018 Mar 29. doi:10.1155/2018/3296893

¹⁰ Moreno J (2019) Assessment of Vaccine-Induced Immunity Against Canine Visceral Leishmaniasis. *Front. Vet. Sci.* 6:168. doi: 10.3389/fvets.2019.00168

¹¹ Yimam, Y. and Mohebbi, M., 2020. Effectiveness of insecticide-impregnated dog collars in reducing incidence rate of canine visceral leishmaniasis: A systematic review and meta-analysis. *PLoS One* Sep 3;15(9):e0238601. doi: 10.1371/journal.pone.0238601. eCollection 2020.

¹² G. A. S. Romero and M. Boelaert, "Control of visceral leishmaniasis in latin America - A systematic review," *PLOS Neglected Tropical Diseases*, vol. 4, no. 1, article no. e584, 2010.

¹³ Dantas-Torres, F., Mirò, G., Baneth, G., Bourdeau, P., Breitschwerdt, E., Capelli, G., Cardoso, L., Day, M.J., Dobler, G., Ferrer, L., Irwin, P., Jongejan, F., Kempf, V.A.J., Kohn, B., Lappin, M., Little, S., Madder, M., Maggi, R., Maia, C., Marcondes, M., Naucke, T., Oliva, G., Pennisi, M.G., Penzhorn, B.L., Peregrine, A., Pfeffer, M., Roura, X., Sainz, A., Shin, S.S., Solano-Gallego, L., Straubinger, R.K., Tasker, S., Traub, R., Wright, I., Bowman, D.D., Gradoni, L., Otranto, D. (2019) Canine Leishmaniasis Control in the Context of One Health. *Emerging Infectious Diseases* 25, e1-e4. <https://doi.org/10.3201/eid2512.190164>

¹⁴ Marcondes M, Day MJ. Current status and management of canine leishmaniasis in Latin America. *Res Vet Sci.* (2019) 123:261–72. doi: 10.1016/j.rvsc.2019.01.022

¹⁵ Palatnik-de-Sousa CB. Vaccines for canine leishmaniasis. *Front Immunol.* 2012;3:69. Published 2012 Apr 17. doi:10.3389/fimmu.2012.00069

¹⁶ C. E. Wylie, M. Carbonell-Antoñanzas, E. Aiassa et al., "A systematic review of the efficacy of prophylactic control measures for naturally occurring canine leishmaniasis. Part II: Topically applied insecticide treatments and prophylactic medications," *Preventive Veterinary Medicine*, vol. 117, no. 1, pp. 19–27, 2014.

3. Approved animal vaccines, where available, should be recommended as appropriate choices for the control and prevention of Leishmaniasis.
4. Health authorities should evaluate programs to ensure that vaccination and parasite prevention services are affordable and available and that unowned dogs are included in leishmaniasis prevention programs.
5. Veterinary professionals working with dogs who travel to, or have been imported from, endemic regions should educate owners on the importance of performing appropriate diagnostic testing and prevention treatments.