



**Istituto Zooprofilattico Sperimentale  
della Lombardia e dell'Emilia – Romagna “Bruno Ubertini”  
Centro di Referenza Nazionale per la Leptospirosi**

## **BOLLETTINO BIBLIOGRAFICO**

**Edizione n. 2026/04**

**Aprile 2026**

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*Le citazioni bibliografiche presentate in questo bollettino sono state ottenute mediante la banca dati Scopus utilizzando come parole chiave "Leptospira" e "leptospirosis" ricercate nei titoli, negli abstracts e nelle parole chiave delle pubblicazioni.*

dos Santos Baptista Borges A.L., Aymée L., Lilenbaum W., Di Azevedo Nogueira M.I.

**Revisiting genital leptospirosis in large animals: impacts on reproductive health, diagnostic challenges, and future directions**

(2026) Journal of Clinical Microbiology, 64 (3)

DOI: 10.1128/jcm.00525-25

**ABSTRACT:** Leptospirosis, caused by *Leptospira* spp. infection, is a globally significant zoonotic disease that affects a wide range of animals. Although renal colonization is well-documented, genital infection by leptospires remained less explored for decades, despite its impact on reproduction. Evidence suggests that genital infection occurs as a primary condition rather than secondary to renal colonization, particularly in cattle suffering from bovine genital leptospirosis (BGL), linked to chronic infections by strains of the Sejroe serogroup. In horses, a similar condition is suggested to be associated with strains of serogroup Australis. Molecular studies confirmed the presence of *Leptospira* DNA in uterine, follicular, and vaginal samples, strengthening the hypothesis of an independent genital physiopathology. Despite significant advances in molecular diagnostics, the detection of genital carriers remains challenging, requiring refined methodologies beyond standard serology. This review critically examines the historical detection of *Leptospira* spp. in genital samples of cattle, small ruminants, swine, and equines, emphasizing its relevance to reproductive health. Moreover, we highlight the limitations of current diagnostic approaches, advocating for increased use of genital samples in leptospirosis research of large animals and shedding light on future directions regarding genital leptospirosis in livestock research. Enhanced understanding and diagnosis of genital leptospirosis will contribute to better livestock reproductive management and disease prevention.

LANGUAGE OF ORIGINAL DOCUMENT: English

Gorman M., Fayne B., Rajeev S.

**Diagnosis of leptospirosis in animals: challenges and perspectives**

(2026) Journal of Clinical Microbiology, 64 (3)

DOI: 10.1128/jcm.01700-24

**ABSTRACT:** Leptospirosis is a life-threatening zoonotic disease with a major public and animal health impact. Annually, approximately 1.03 million people are affected by leptospirosis, but our understanding of its impact on animals is limited. The epidemiology, pathogenesis, clinical presentation, diagnostic methods, and control measures for this disease differ significantly between humans and animals. This difference is due in part to the wide range of animal species that can be infected, the different infecting serovars present across species and geographic regions, and the existence of chronic asymptomatic reservoirs. Additionally, diagnosing leptospirosis in animals is complicated by the limited availability of sensitive, specific, and affordable diagnostic tools that can be employed at the point of care. There is often a trade-off between the sensitivity/specificity and accessibility of these diagnostics, and no single diagnostic test is entirely reliable. Many newer diagnostic methods lack validation for use in various animal species and clinical samples. In this minireview, we discuss the methods used for detecting *Leptospira*-infected animals and challenges associated with these techniques.

LANGUAGE OF ORIGINAL DOCUMENT: English

Buadze N., Turmanidze M., Imnadze P., Kazakashvili N.

**Impact of the Covid-19 pandemic on the surveillance of infectious diseases: assessment of the leptospirosis surveillance system in the Adjara Region (2020–2024)**

(2026) Georgian Medical News, 370 (1), pp. 167 - 174

**ABSTRACT:** Leptospirosis is classified as an infection subject to mandatory notification; however, surveillance effectiveness varies across regions in Georgia. The aim of the present study was to assess the impact of the COVID-19 pandemic on the leptospirosis epidemiological surveillance system in the Adjara region during 2020–2024. A mixed-methods assessment was conducted following the CDC Updated Guidelines for Evaluating Public Health Surveillance Systems (MMWR, 2001) and national NCDC regulations. Data quality was high within the evaluated subset of cases (86.1%); however, overall system-wide data completeness was low (46.1%), reflecting substantial limitations in routine surveillance data quality. Timeliness significantly declined during 2020–2021 due to COVID-19–related system overload and laboratory delays. Case detection was uneven across municipalities, and field findings revealed gaps in case identification, diagnostic access, and accurate completion of mandatory reporting forms. The Adjara leptospirosis surveillance system demonstrated moderate performance but notable vulnerabilities amplified by the COVID-19 pandemic.

LANGUAGE OF ORIGINAL DOCUMENT: English

Gurusighe D.Y., de Silva G.N.N., Pieris M.N.A., Farwin M.A.F., Lasantha W.K.D., Vashini M.

**Clinical presentation, epidemiological characteristics and complications of leptospirosis in children: a study in a Base Hospital in Sri Lanka**

(2026) Sri Lanka Journal of Child Health, 55 (1), pp. 17 - 21

DOI: 10.4038/sljch.v55i1.11469

**ABSTRACT:** Introduction: Leptospirosis is a zoonotic disease, caused by a spirochaete, mainly genus leptospira. Although many studies of leptospirosis in adults have been documented, no published data are available on children with leptospirosis in Sri Lanka. It can range from mild flu like illness to a severe multi-organ dysfunction and the diagnosis can be missed unless there is a high index of suspicion. Objectives: To describe the clinical patterns, epidemiological characteristics and complications of leptospirosis in Sri Lankan children. Method: This was a descriptive study on clinically suspected and confirmed patients with leptospirosis who were admitted to Base Hospital Panadura from 2019 to 2022. Results: A total of 35 patients was included in this study and 25 were confirmed as leptospirosis with positive micro-agglutination testing titre >1:400, or with positive leptospira DNA, qualitative, real-time polymerase chain reaction; 19 (76%) were male and 6 (24%) were female. There were 15 (68%) children >10 years, 4 were between 5-10 years and 3 were <5 years; 100% had a history of fever. Arthralgia (56%), myalgia (64%), vomiting (60%), abdominal pain (28%) and headache (44%) were the common symptoms. Common signs were conjunctival suffusion (60%), hepatomegaly (52%) and cervical lymphadenopathy (24%). Leucocytosis was observed in 28% and 100% had neutrophil predominance. Thrombocytopenia (150,000/mL) was observed in 44%. Elevated C-reactive protein was observed in 100%. Renal functions were deranged in 16%; 2 patients developed shock following commencement of antibiotics which needed inotropic support for several hours. No deaths were reported during the study period. No patients had serious complications like acute renal failure needing renal replacement therapy, or pulmonary haemorrhage. Conclusions: Leptospirosis was commoner in males (76%). Fever (100%), arthralgia (56%), myalgia (64%), vomiting (60%), abdominal pain (28%) and headache (44%) were the common symptoms. Common signs were conjunctival suffusion (60%), hepatomegaly (52%) and cervical lymphadenopathy (24%). Leucocytosis was observed in 28%, neutrophilic predominance in 100% and thrombocytopenia in 44%. There were no deaths.

LANGUAGE OF ORIGINAL DOCUMENT: English

Wei W., Jiao D., Dong X., Shi R., Sa R., Ma C., An L., Wen J., Zhang X., Wang R.

**Epidemiology and associated factors of human and canine leptospirosis in China: a systematic review and meta-analysis**

(2026) Preventive Veterinary Medicine, 251, art. no. 106855

DOI: 10.1016/j.prevetmed.2026.106855

ABSTRACT: Leptospirosis, a neglected zoonotic disease caused by pathogenic *Leptospira* spp., poses ongoing challenges in China due to shared environmental exposure of humans and dogs. To summarize available epidemiological evidence, we conducted a PRISMA-compliant systematic review and meta-analysis of human and canine leptospirosis in China. Six databases (PubMed, Web of Science, ScienceDirect, CNKI, Wanfang, and VIP) were searched for eligible studies published up to 11 November 2025. Cross-sectional data were synthesized using random-effects models, with subgroup analyses applied to explore heterogeneity. A total of 109 studies from 29 provinces were included, comprising 111,542 human samples and 8875 dog samples. The pooled prevalence was estimated at 25.00% in humans and 12.00% in dogs, with substantial heterogeneity across studies. In humans, higher prevalence estimates were generally observed in central regions, earlier decades, middle-aged adults, populations classified as having higher exposure, and rural areas. Serovar distributions also differed across populations, with *Icterohaemorrhagiae* predominating in humans. In dogs, prevalence and serovar distributions varied across studies, with *Canicola* being the most frequently reported serogroup, and higher prevalence estimates commonly observed in unvaccinated and free-roaming animals. Overall, this study provides a descriptive synthesis of leptospirosis in humans and dogs in China. Given the substantial heterogeneity, wide confidence intervals, and data limitations, the findings should be interpreted cautiously as reflecting broad epidemiological patterns rather than confirmatory evidence of causal risk factors. Nonetheless, the results highlight populations, regions, and serovars that may warrant prioritization in surveillance and One Health-oriented prevention efforts.

LANGUAGE OF ORIGINAL DOCUMENT: English

Kawamoto A., Kuribayashi T., Morita M., Nakamura S., Koizumi N.

**Asymmetric sheath coordination controls flagellar architecture and function in *Leptospira* spirochete**

(2026) EMBO Journal

DOI: 10.1038/s44318-026-00731-1

ABSTRACT: Bacterial flagella are essential for motility, but their structure and how they generate movement vary greatly. Most motile bacteria use external helical flagella, whereas spirochetes have periplasmic flagella (PFs) that distort the cell body to drive forward movement. Here, we generated sheath protein knockout mutants and used high-resolution cryo-electron microscopy to elucidate the mechanisms underlying PF assembly, curvature, and rigidity in *Leptospira biflexa*. The PF consists of a FlaB1-based core filament surrounded asymmetrically by sheath proteins. Weak but essential binding of FlaA2 to the core enables asymmetric localization of the coiling protein FcpA. FcpA alone can induce curvature, whereas FcpB acts as a structural wedge that reinforces PF rigidity and enables efficient swimming in liquid. Specific glycosylation of FlaB1 mediates sheath-core interactions and may guide the assembly of sheath components. We propose that sheath proteins interact transiently with the core and may be anchored to the outer membrane, allowing core rotation beneath a static sheath. These findings reveal how cooperative interactions among sheath components confer structural and mechanical specialization to spirochete flagella.

LANGUAGE OF ORIGINAL DOCUMENT: English

Ilmie A.N.M.U., Costa F., Shafie N.J.

**Knowledge level on leptospirosis disease among preuniversity students**

(2025) Journal of Sustainability Science and Management, 20 (12), pp. 2548 - 2555

DOI: 10.46754/jssm.2025.12.001

**ABSTRACT:** Leptospirosis, also known as rat-urine disease, is a type of zoonotic disease that has a high prevalence in tropical countries, including Malaysia. Current knowledge about the spread of this disease is limited to urban and suburban areas. Recreational forest areas consistently contribute to the spread of the disease among humans. Understanding of this disease and its transmission is still lacking among various segments of society, especially among youths. A cross-sectional study was conducted to assess the level of knowledge regarding leptospirosis among 57 pre-university students at Universiti Malaysia Terengganu and to compare knowledge levels based on gender. Data collection was carried out using a validated questionnaire in Google Form, which was distributed randomly through WhatsApp groups between 1 December 2023 and 31 January 2024. All respondents were 18 years old, with 51% identifying as female and 49% as male. The results indicated that there was no significant difference in knowledge levels based on gender among the students ( $p > 0.05$ ). However, there were notable gaps in their knowledge, particularly regarding the causes, symptoms, transmission routes, and prevention of leptospirosis. Therefore, it is crucial to enhance their understanding through comprehensive strategies aimed at younger generations to prevent potential outbreaks and ensure effective management and control of leptospirosis.

LANGUAGE OF ORIGINAL DOCUMENT: English

Crump J.A., Picardeau M., Ajanovic S.A., Bradley J., Bramugy J.M., Chimanya M., Green E.W., Lal S., Mabey D.C.W., Mayxay M., Newton P.N., Oлару I.D., Hopkins H., Bottomley C., Amos B., Ashley E.A., Baerenbold O., Baghoumina S., Balanza N., Bandason T., Bassat Q., Bhattacharyya T., Blacksell S.D., Boca Z., Chandler C.I.R., Chansamouth V., Chipanga J., Cossa A., Dauya E., Davis C., De Lamballerie X., Dixon J., Douangphachanh S., Dubot-Pérès A., Durkin M.M., Feasey N.A., Ferrand R.A., Fink C., Fitchett E.J.A., Gerada A., Graves S.R., Handley B.L., Hutchison C.D., Jaksuwan R., Jervis J., Jones J., Kain K.C., Keddie S.H., Khounpaseuth K., Kranzer K., Kunlaya K., Lal P., Laloo D.G., Luangraj M., Lubell Y., MacPherson E., Makoga F., Manichan S., Marlais T., Maurer F., Miles M., Mogeni P., Mucasse C., Nguyen C., Phimolsarnnousith V., Roberts C.H., Sengduangphachanh A., Sengsavang S., Sibanda M., Singha S., Stenos J., Tanganuchitcharnchai A., Tanvir H., Ussher J.E., Valente M., Voice M.A., Vongsouvath M., Wamaka M., Wheat L.J., Yeung S.

**Leptospirosis incidence at four sites in Sub-Saharan Africa and South East Asia: an international multi-site hybrid surveillance study**

(2026) Open Forum Infectious Diseases, 13 (3), art. no. ofag021

DOI: 10.1093/ofid/ofag021

**ABSTRACT:** Background There are few leptospirosis incidence studies despite such estimates being central to accurate burden of disease estimation. We used data from the multicenter Febrile Illness Evaluation in a Broad Range of Endemicities (FIEBRE) study to make leptospirosis incidence estimates from new sites. Methods Febrile patients aged  $\geq 2$  months in Laos, Malawi, Mozambique, and Zimbabwe were enrolled and underwent standardized clinical and exposure assessment. Acute and convalescent sera were tested by *Leptospira* microscopic agglutination test and acute plasma by *lfb1* polymerase chain reaction (PCR). Participants with  $\geq 4$ -fold rise in antibody titer between acute and convalescent sample, or *Leptospira* PCR

positive for the lfb1, had confirmed leptospirosis. Leptospirosis incidence was estimated after adjusting for incomplete enrollment of febrile patients, availability of paired sera, and use of study healthcare facilities by febrile patients based on healthcare utilization data from community controls. Results Leptospirosis incidence (95% CI) per 100 000 population per year was 1302 (1011, 1677) in Laos, 1337 (874, 2044) in Malawi, 187 (85, 409) in Mozambique, and could not be calculated for Zimbabwe. Sensitivity analysis restricted to pre-COVID years of 2018 and 2019 produced similar estimates of incidence to that of the whole study period. Conclusions Leptospirosis incidence was high at the Laos, Malawi, and Mozambique sites and at the upper end of published incidence estimates from the Asia and Africa regions. We recommend more leptospirosis incidence studies be done in areas lacking data to strengthen leptospirosis global burden of disease estimates and to stimulate progress on diagnosis, management, and control.

LANGUAGE OF ORIGINAL DOCUMENT: English

Rajapakse S., Gangani D., Rodrigo C., Fernando N.

**Renal tropism, serovar biology, and severe leptospirosis: a kidney-centred hypothesis**

(2026) Medical Hypotheses, 210, art. no. 111956

DOI: 10.1016/j.mehy.2026.111956

ABSTRACT: Leptospirosis manifestations range from a self-limiting febrile illness to fulminant multi-organ failure with jaundice, pulmonary haemorrhage, and acute kidney injury (AKI). Kidney involvement is common and prognostically important, typically manifesting as non-oliguric, hypokalaemic tubulointerstitial nephritis rather than primary glomerular disease. Although certain *Leptospira interrogans* serovars, i.e., Icterohaemorrhagiae and Copenhageni, are frequently reported in association with severe disease, a clear biological explanation for this observation remains elusive. In reservoir and experimental hosts, pathogenic leptospires show marked serovar- and strain-specific differences in their ability to colonise renal proximal tubules and persist as chronic urinary shedders. In parallel, human cohort data now link acute leptospira-associated AKI, and even asymptomatic exposure, to an increased long-term risk of chronic kidney disease (CKD). However, these renal insights have rarely been integrated into mechanistic models of acute severe leptospirosis. We propose a kidney-centred hypothesis: that severe leptospirosis in humans is more likely when infection is caused by serovars and strains with high intrinsic affinity for renal tubular epithelial cells and enhanced capacity to evade immune clearance within the kidney. Early and efficient renal colonisation may enable sustained tubulointerstitial inflammation, dysregulated tubular handling of solutes and volume, and possibly intermittent release of organisms or their antigens back into the circulation, amplifying systemic endothelial injury, inflammation and multi-organ dysfunction. We outline testable predictions, clinical and experimental study designs that could confirm or refute this hypothesis, and we discuss how such a framework could refine risk stratification, guide diagnostic and vaccine development, and highlight novel therapeutic targets.

LANGUAGE OF ORIGINAL DOCUMENT: English

Galvão C.M.M.Q., Leite D.P.S.B.M., Oliveira P.R.F., Silva V.V., Silva S.S., Nogueira D.B., Azevedo S.S., Ramos R.A.N., Mota R.A.

**First serological investigation of *Toxoplasma gondii*, *Neospora caninum*, *Leishmania infantum* and *Leptospira* spp. in dogs from a Fulni-ô Indigenous community in Pernambuco, Brazil: a One Health perspective [Primeira investigação sorológica de *Toxoplasma gondii*, *Neospora caninum*, *Leishmania***

**infantum e *Leptospira spp.* em cães de uma comunidade indígena Fulni-ô em Pernambuco, Brasil: uma perspectiva de Saúde Única]**

(2025) Brazilian Journal of Biology, 85, art. no. e300853

DOI: 10.1590/1519-6984.300853

**ABSTRACT:** Zoonotic diseases pose a major public health threat in indigenous communities due to geographic isolation, inadequate sanitation, and close contact between humans, domestic animals, and wildlife. This study aimed to investigate the presence of antibodies against *Toxoplasma gondii*, *Neospora caninum*, *Leishmania infantum*, and *Leptospira spp.* in dogs from the Fulni-ô indigenous community, located in Águas Belas, Pernambuco, Brazil. Blood samples were collected from 66 free-roaming or semi-domiciled dogs for serological analysis. Indirect immunofluorescence tests (IFAT) were used to detect antibodies for *T. gondii* and *N. caninum*, while *Leishmania infantum* detection was performed using the TR DPP® Canine Visceral Leishmaniasis kit. The presence of *Leptospira spp.* was evaluated for microscopic agglutination test (MAT). Results revealed seropositivity rates of 46.9% (31/66) for *T. gondii*, 9.1% (6/66) for *N. caninum*, 22.7% (15/66) for *Leishmania infantum*, and 18.2% (12/66) for *Leptospira spp.* Among the *Leptospira spp.* serovars identified, *Icterohaemorrhagiae* (83.3%, 10/12) and *Pomona* (50.0%, 6/12) were most prevalent, which were associated with environmental reservoirs and inadequate sanitation conditions. The findings suggest that the dogs in the Fulni-ô community act as environmental sentinels, reflecting local zoonotic risks. This pioneering study highlights the need for One Health-based strategies to prevent zoonotic diseases in vulnerable indigenous communities.

LANGUAGE OF ORIGINAL DOCUMENT: English

Esteban M., Sanchez C., Rodriguez M.A., Saraullo V.R., Hamer M., Brihuega B.F., Samartino L., Martinez M.L.

**Development of an ELISA as a complement to MAT for swine leptospirosis diagnosis**

(2026) Research in Veterinary Science, 206, art. no. 106170

DOI: 10.1016/j.rvsc.2026.106170

**ABSTRACT:** Leptospirosis is a widespread zoonotic disease caused by pathogenic spirochetes of the genus *Leptospira*, affecting humans and a broad range of domestic and wild animals, which act as maintenance or incidental hosts. In swine, infection is associated with reproductive losses and significant economic impact. Transmission occurs through direct or indirect contact with contaminated urine, soil, or water. In small-scale and extensive production systems, frequent exposure to mud, stagnant water, and wildlife increases the risk of infection with multiple *Leptospira* serovars, complicating diagnosis. Rapid and reliable diagnostic tools are therefore essential for effective surveillance and control. The aim of this study was to evaluate an enzyme-linked immunosorbent assay (ELISA) based on a bacterial sonicated antigen as a complementary method to the microscopic agglutination test (MAT). Using MAT as the reference method, a panel of swine sera was analyzed to determine diagnostic performance. The ELISA showed a sensitivity of 83% and a specificity of 96%, demonstrating good agreement with MAT. These results indicate that the assay provides acceptable diagnostic accuracy and may serve as a practical complementary tool for herd-level screening and surveillance of swine leptospirosis.

LANGUAGE OF ORIGINAL DOCUMENT: English

Senavirathna I., Jayasundara D., Warnasekara J., Agampodi S., Putz E.J., Nally J.E., Bayles D.O., Chaurasia R., Vinetz J.M.

**Genomic analysis of human-infecting *Leptospira borgpetersenii* isolates in Sri Lanka: expanded PF07598 gene family repertoire and less genome reduction than bovine isolates**

(2026) PLoS neglected tropical diseases, 20 (3), pp. e0012540

DOI: 10.1371/journal.pntd.0012540

**ABSTRACT:** *Leptospira borgpetersenii* is a causative agent of human leptospirosis, with the potential to lead to severe disease manifestations. The first published analysis of *L. borgpetersenii*, performed on two strains of serovar Hardjo (L550 and JB197), suggested that the *L. borgpetersenii* genome is in the process of genome decay with functional consequences leading to a more obligately host-dependent life cycle. Whole genome analysis has only been carried out on few strains of *L. borgpetersenii*, with limited closed genomes and comprehensive analyses. Herein we report the complete, circularized genomes of seven non-typeable *Leptospira borgpetersenii* isolates from human leptospirosis patients in Sri Lanka. These isolates (all identified as strain ST144) were found to be nearly identical by whole genome analysis; serotyping with serogroup-specific reference antisera was unreactive, suggesting that these are members of a novel serogroup/serovar. We show that the *L. borgpetersenii* isolated from humans in Sri Lanka show less genomic decay than previously reported isolates: fewer pseudogenes (N = 141) and insertion sequence (IS) elements (N = 46) compared to N = 248, N = 270, and N = 400 pseudogenes, and N = 121 and N = 116 IS elements in other published *L. borgpetersenii* Hardjo genomes (strains L550, JB197 and TC112). Compared to previously published *L. borgpetersenii* whole genome analyses showing two or three VM proteins in *L. borgpetersenii* isolates from cattle, rats and humans, we found that all of the human *L. borgpetersenii* isolates from Sri Lanka, including previously reported serovar Piyasena, have four encoded VM proteins, one ortholog of *L. interrogans* Copenhageni LIC12339 (LA1402) and three orthologs of LIC12844 (LA0589). Our findings of fewer pseudogenes, IS elements, and expansion of the LIC12844 homologs of the PF07598 family in these human isolates suggests that this newly identified *L. borgpetersenii* serovar from Sri Lanka has unique pathogenicity. Comparative genome analysis and experimental studies of these *L. borgpetersenii* isolates offer deeper insights into the molecular and cellular mechanisms of leptospirosis pathogenesis.

LANGUAGE OF ORIGINAL DOCUMENT: English

Abdullah M., Kadivella M., Vyas P., C P J., Palanisamy B., Azam S., Faisal S.M.

**A multi-epitope approach for development of a universal vaccine against leptospirosis**

(2026) Frontiers in immunology, 17, pp. 1774717

DOI: 10.3389/fimmu.2026.1774717

**ABSTRACT:** Introduction: *Leptospira*, a zoonotic pathogen, poses a significant public health threat, causing morbidity and mortality in both humans and animals. Although several bacterin and recombinant vaccines targeting specific serovars have been developed, most provide short-term, serovar-restricted protection and do not consistently induce sterilizing immunity or broad cross-serovar coverage. Materials: To address this challenge, we employed comparative pan-genomic analysis and reverse vaccinology to identify conserved potential vaccine candidates (PVCs) and designed a multi-epitope vaccine (MEV) incorporating highly immunogenic B- and T-cell epitopes. Unlike previous studies largely limited to computational prediction or a small number of known antigens, our strategy integrates soft-core genome-wide antigen prioritization with structural validation and experimental evaluation of innate and adaptive immune responses. Selected epitopes were linked with appropriate spacers and fused to a TLR4 agonist (APPHALS) at the N-terminus to enhance immune activation. Results and discussion: In silico analyses confirmed the stability and immunogenic

potential of the MEV construct. The purified recombinant MEV reacted strongly with hyperimmune and clinical sera. Anti-MEV antibodies agglutinated multiple pathogenic *Leptospira* serovars and inhibited bacterial growth in vitro. MEV stimulation induced macrophage activation, evidenced by increased proinflammatory cytokine production and upregulation of co-stimulatory molecules. Immunization in mice elicited robust humoral and T-cell responses. Collectively, these findings position MEV as a rationally designed next-generation vaccine candidate with potential for broad cross-protective immunity against leptospirosis.

LANGUAGE OF ORIGINAL DOCUMENT: English

Lennon L.F., Sahin O., Batikawai S., Reid S.A.

**A one health approach to water as an ecological enabler for leptospirosis: a system dynamics model**

(2026) *Systems*, 14 (3), art. no. 237

DOI: 10.3390/systems14030237

**ABSTRACT:** Leptospirosis is a neglected zoonotic disease of global importance and remains a persistent public health challenge in Fiji, where outbreaks frequently occur following extreme weather events. This study developed a One Health System Dynamics model to simulate interacting human, rodent, and environmental subsystems over a 24-month outbreak-relevant period, parameterised using published epidemiological and ecological data. Model validity and robustness were assessed through the reproduction of known epidemiological patterns, including seasonal trends. Results indicate that leptospirosis incidence is primarily driven by the interaction between rodent population dynamics and water systems, with standing water acting as a critical ecological enabler for both *Leptospira* persistence and rodent habitat suitability. Extreme scenario testing indicated that eliminating water contamination drove cases to near zero within 14 months, whereas soil contamination had minimal effect. Sensitivity analyses identified rodent birth and death rates as the most influential parameters governing system behaviour. While an integrated One Health intervention produced the greatest cumulative reduction in cases (21.07%), intervention effects were additive rather than synergistic, reflecting the dominance of underlying ecological feedback structures. This study offers a novel system-based framework for understanding leptospirosis burden in Fiji. It advances beyond static risk models by capturing endogenous dynamics, feedback loops, and non-linear interactions. The findings highlight the need for genuine cross-sectoral coordination and ecologically based rodent management near water bodies to sustainably reduce Fiji's disease burden.

LANGUAGE OF ORIGINAL DOCUMENT: English

Fanelli A., Alglave B., Caporaso L., Cescatti A., Ciscar J.-C., Dubois G., Dosio A., Estevez-Reboredo R.M., Blazquez M., Ibarreta D., Mandrici A., Massaro E., Lowe R., Szewczyk W.

**Spatiotemporal dynamics of leptospirosis in Europe: a retrospective observational study with prospective projections**

(2026) *The Lancet Regional Health - Europe*, 65, art. no. 101671

DOI: 10.1016/j.lanepe.2026.101671

**ABSTRACT:** Background Leptospirosis is a widespread zoonotic disease caused by *Leptospira* spp., with a substantial burden on both human and animal health. Transmission occurs through contact with the urine of infected animals, with rodents serving as the main disease reservoir. Climate and environmental changes, including higher temperatures, heavy rainfall, urbanization, forest encroachment, and biodiversity loss are expected to alter rodent populations and disease dynamics, raising concerns about the increasing risk of

leptospirosis in Europe. Despite this, no comprehensive risk map or modelling study has been conducted at the European scale. Given this, we aimed to quantify spatiotemporal patterns of leptospirosis risk in Europe and project future incidence rate under climate change scenarios. Methods In this study, we present a Europe-wide spatiotemporal assessment of leptospirosis risk, integrating epidemiological, environmental and climate data. Using monthly leptospirosis cases from the European Surveillance System (TESSy) between 2010 and 2023, we developed a Bayesian hierarchical model to identify key risk factors, including the 3-month Standardised Precipitation Evapotranspiration Index (SPEI-3), mean temperature (Tmean), forest human nexus and mammal richness. Future changes in disease incidence rate were also investigated under two climate/socio-economic scenarios, namely the Shared Socioeconomic Pathways (SSP) 4.5 and 8.5. Findings Over the 2010–2023 period, leptospirosis risk was higher in areas with elevated SPEI-3 (maximum relative risk [RR] = 1.62; 95% CrI: 1.20–2.10) and higher Tmean values (maximum RR = 5.28; 95% CrI: 2.65–11.12), both with a 1-month lag. Leptospirosis incidence rates were greater in warm coastal regions and densely populated areas. We observed a complex relationship between disease risk and the forest human nexus (maximum RR = 1.23; 95% CrI: 0.96–1.55), and a negative association with mammal species richness (minimum RR = 0.63; 95% CrI: 0.40–0.98), suggesting a potential dilution effect. Finally, under future climate scenarios, we found that leptospirosis incidence rate is projected to increase, particularly under high greenhouse gas (GHG) emissions, with larger rises expected in the long-term period (2081–2100) than in the short-term period (2041–2060). Interpretation Climate and environmental factors can elevate the risk of leptospirosis with climate change projected to have a significant impact on future risk levels. Our findings underscore the need for proactive measures to mitigate the effects of climate-sensitive zoonoses, such as leptospirosis, across Europe. Integrating spatial and temporal disease models into early warning systems, alongside environmental management and climate mitigation strategies, can support timely interventions and enhance public health resilience. Funding This research received no specific grant from any funding agency in the public, private, or not-for-profit sectors.

LANGUAGE OF ORIGINAL DOCUMENT: English

Ejrnæs L.R., Pedersen A.A., Knudtzen F.C., Andersen N.S., Dröse S.

### **Leptospirosis [Leptospirose]**

(2026) Ugeskrift for laeger, 188 (12)

DOI: 10.61409/V09250719

ABSTRACT: Two patients with severe leptospirosis, infected in Denmark, developed multi-organ failure. A previously healthy woman presented with poor general condition and was diagnosed with cerebrospinal fluid PCR. A man with hypertension developed cardiopulmonary failure and tested positive for *Leptospira* in urine. In this case report, both received intensive care with vasopressors and antibiotics, improved clinically, and were discharged for follow-up.

LANGUAGE OF ORIGINAL DOCUMENT: Danish

Maksimović Z., Babić S., Milanović G., Rifatbegović M.

### **Serological survey of leptospirosis in sheep in Bosnia and Herzegovina**

(2026) Ankara Universitesi Veteriner Fakultesi Dergisi, 73 (2), pp. 203 - 208

DOI: 10.33988/auvfd.1737403

**ABSTRACT:** Leptospirosis, a reemerging zoonotic disease caused by pathogenic bacteria of the genus *Leptospira*, affects a wide range of domestic and wild animals. The only investigation into sheep leptospirosis in Bosnia and Herzegovina was conducted nearly 50 years ago. This study aimed to assess the seroprevalence of leptospirosis and to identify the most common serovars in sheep in Bosnia and Herzegovina, using the microscopic agglutination test (MAT). Leptospirosis seroprevalence was determined to be 2.16% at a cut-off titer of  $\geq 1:100$  (55/2542) and 8.10% at a cut-off of  $\geq 1:25$  (206/2542), with all positive cases related to a single serovar. The MAT titers were 1:25 and 1:100, with the majority of positive animals having low titer (1:25) (151/206; 73.3%). At a cut-off of  $\geq 1:100$ , the sera most frequently reacted to Pomona (54.55%) and Hardjo (27.27%), and less commonly to Saxkoebing and Icterohaemorrhagiae (0.2%) ( $P < 0.05$ ). Odds of seropositivity were higher for Pomona and Hardjo than for Saxkoebing and Icterohaemorrhagiae. The results of this study showed for the first time in Bosnia and Herzegovina, the presence of serovar Icterohaemorrhagiae in sheep, with Pomona and Hardjo as the dominant serovars. Although the seroprevalence is low, the potential zoonotic risk requires continuous monitoring and control strategies to prevent the spread of leptospirosis.

**LANGUAGE OF ORIGINAL DOCUMENT:** English

Manalo J.I.G., Realingo A.M.L., Dancel L.L.M., Dizon T.J.R., Nicolasora A.D., Alvarado-Dela Cruz K., Argana D.D., Digman A.N.A., Medina E.J.G., Roxas C.B.A., Baterna R.A., Dungca J.Z.

**Retrospective molecular detection and characterization of pathogenic *Leptospira* in the Philippines**

(2026) Tropical Medicine and Infectious Disease, 11 (3), art. no. 69

DOI: 10.3390/tropicalmed11030069

**ABSTRACT:** Leptospirosis remains a public health concern in the Philippines. Conventional diagnostic methods, including the microscopic agglutination test (MAT) and qPCR, are routinely used for outbreak response and surveillance. However, these methods often yield discordant results due to cross-reactivity, limited sensitivity, or lack of species-level resolution. To address these diagnostic gaps, this study optimized the Boonsilp 16S rRNA PCR assay and applied Sanger sequencing for accurate species identification of *Leptospira* in 92 archived DNA samples collected between 2018 and 2020. The sensitivity and specificity of the optimized assay were compared with those of MAT and qPCR. Species-level identification was confirmed via sequencing, and a phylogenetic tree was constructed. Among the 92 samples, 46 (50.0%) tested positive by qPCR, 39 (42.4%) by MAT, and 67 (72.8%) by at least one of the two methods. The optimized Boonsilp assay detected *Leptospira* in 23 samples (25.0%), of which 22 were also qPCR positive. Twenty-one samples were confirmed as *L. interrogans*, one as *L. borgpetersenii*, and one as an unclassified *Leptospira* species. One sample undetected by both MAT and qPCR tested positive using the optimized assay. Compared to the composite reference, the Boonsilp assay showed 32.8% sensitivity and 96.0% specificity. Phylogenetic analysis revealed multiple *L. interrogans* strains, including those closely related to reference sequences of Copenhageni, Manilae, and Canicola. While the optimized Boonsilp PCR assay demonstrates diagnostic value as an adjunct molecular tool to qPCR and MAT supporting species-level identification during outbreak surveillance, this warrants further validation in freshly isolated DNA samples.

**LANGUAGE OF ORIGINAL DOCUMENT:** English

Khordadmehr M., Sadri H., Shirazi J., Akbari H., Jafarizadeh A.R., Nofouzi K., Hamali H., Jigari-Asl F., Katirae F.

**Molecular and pathological studies on *Leptospira* and *Campylobacter* infections in aborted fetuses from northwest Iran**

(2025) Journal of Zoonotic Diseases, pp. 1008 - 1015

DOI: 10.22034/jzd.2025.64588.1333

**ABSTRACT:** This study was performed to identify *Leptospira* and *Campylobacter* infections in aborted fetuses of small domestic ruminants, including sheep and goats in East Azerbaijan province, northwest Iran. For this purpose, a total of 62 aborted fetuses were collected from sheep and goat flocks. At necropsy, tissue samples were collected for histopathological (brain, liver, kidney, and lung) and molecular studies (abomasal content). The conventional PCR method using specific primers was conducted for the molecular evaluations. Additionally, the formalin-fixed tissue samples were routinely processed for histopathological examinations. The genomes of *Leptospira* and *Campylobacter* were detected in 19.35% and 22.58% of the examined fetuses, respectively. And three out of 62 (4.83%) aborted fetuses demonstrated positive results for both infections. Histopathological studies demonstrated multifocal gliosis and nonsuppurative meningoencephalitis in the brain, multifocal necrotic hepatitis in the liver, multifocal tubular necrosis in the kidney, and suppurative bronchopneumonia in the lung. In conclusion, the identification of *Leptospira* and *Campylobacter* genomes in aborted fetuses with high prevalence rates indicates that these infections play a notable role in the abortion of sheep and goats in East Azerbaijan. Therefore, preventing and controlling these infections in this region is necessary, particularly regarding their zoonotic potential and public health.

LANGUAGE OF ORIGINAL DOCUMENT: English

Yu Y., Hong S., Wang Z., Li S., Zhang S.

**Leptospirosis-induced diffuse alveolar hemorrhage: a rare case report from a non-epidemic area and literature review**

(2026) Medicine, 105 (13), pp. e48131

DOI: 10.1097/MD.00000000000048131

**ABSTRACT: RATIONALE:** Leptospirosis is an uncommon cause of severe pneumonia and diffuse alveolar hemorrhage (DAH), particularly in non-endemic areas, posing a significant diagnostic challenge. This case highlights the critical role of advanced molecular diagnostics in identifying this rare and life-threatening presentation. **PATIENT CONCERNS:** A 65-year-old woman presented with an acute onset of high fever, chest tightness, and rapidly progressive shortness of breath. **DIAGNOSES:** The patient was initially misdiagnosed with severe community-acquired pneumonia. She subsequently developed septic shock and multiple organ dysfunction syndrome. A definitive diagnosis of leptospirosis-induced DAH was confirmed through metagenomic next-generation sequencing, reverse transcription quantitative PCR, and subsequent seroconversion shown by immunoglobulin M enzyme-linked immunosorbent assay. **INTERVENTIONS:** Upon diagnosis, targeted antimicrobial therapy with intravenous penicillin was initiated. Supportive care included management of septic shock and lung-protective ventilation for concomitant acute respiratory distress syndrome. **OUTCOMES:** Following the confirmation of leptospirosis and initiation of targeted treatment, the patient's condition gradually stabilized. After a course of intensive care, she made a full recovery and was successfully discharged. **LESSONS:** This case underscores that leptospirosis can present as fulminant DAH even in non-endemic regions. A high index of suspicion, aided by epidemiological clues and the rapid application of metagenomic next-generation sequencing/reverse transcription quantitative PCR, is crucial for

timely diagnosis. Prompt targeted antimicrobial therapy combined with intensive organ support is essential for a favorable outcome in severe cases.

LANGUAGE OF ORIGINAL DOCUMENT: English

Garcia L.E., Lin Z., Culos S., Muenker M.C., Johnson E.E., Wang Z., Lopez-Giraldez F., Giraud-Gatineau A.,  
**DMEM and EMEM as alternate growth media for pathogenic Leptospira**

(2026) PLoS neglected tropical diseases, 20 (3), pp. e0014136

DOI: 10.1371/journal.pntd.0014136

ABSTRACT: Pathogenic *Leptospira* species can survive and thrive in a wide range of environments. Distinct environments expose the bacteria to different temperatures, osmolarities, and amounts and sources of nutrition. However, leptospires are mostly cultured in a laboratory setting under in vitro conditions that do not reflect natural environments. This constraint on laboratory cultures limits the applicability of in vitro studies to the understanding of even simple pathogenic processes. Here we report, investigate, and identify a medium and conditions that mimic the host environment during leptospirosis infection, expanding the available in vitro tools to evaluate leptospiral pathogenesis. We quantified genome-wide transcription of pathogenic *Leptospira interrogans* cultured in different in vitro media compositions and conditions-EMJH at 29 °C and DMEM, EMEM, and HAN at 37 °C and 5% CO<sub>2</sub>. Using EMJH as standard, we compared gene expression in these compositions to genome-wide transcription gathered in a host environment: whole blood (WB) of hamsters after infection with pathogenic leptospires. Leptospires cultured in DMEM and EMEM media shared 40% and 47% of all differentially expressed genes (DEGs) of leptospires present within WB (FDR < 0.01), while leptospires cultured in HAN media only shared 20% of DEGs with those from WB. Furthermore, gene and pathway expression of leptospires cultured on DMEM and EMEM media exhibited a better correlation with leptospires grown in WB, including promoting expression of a similar leptospiral lipid A profile to the one identified directly in host tissues. Taken together, these results indicate that commercial cell-culture media EMEM or DMEM are better surrogates for in vivo pathogenic studies than EMJH or HAN media in *Leptospira*. These alternative culture conditions, using media that are a standard supply worldwide, provide a reproducible and cost-effective approach that can accelerate research investigation and reduce the number of animal infections necessary for basic research of leptospirosis.

LANGUAGE OF ORIGINAL DOCUMENT: English

Raymundo E.F., Pinto G.D.O.A., Silva G.G.D., Santos A.D.S., Pessoa R.D., Correia D.S., Batista A.M., Samico-Fernandes E.F.T., Mota R.A.

**Molecular detection of *Leptospira* spp. in ovarian structures of naturally infected ruminants and its potential impact on reproductive function**

(2026) Comparative Immunology, Microbiology and Infectious Diseases, 127, art. no. 102465

DOI: 10.1016/j.cimid.2026.102465

ABSTRACT: Leptospirosis is a disease caused by spirochetes of the genus *Leptospira* and is widely recognized for its ability to infect a broad diversity of hosts. Infection by this agent can compromise reproductive efficiency, however, the involvement of ovarian structures in the dynamics of infection remains poorly understood. In this context, the present study aimed to investigate the presence of anti- *Leptospira* spp. antibodies and bacterial DNA in ovarian structures of cows and ewes naturally exposed to the pathogen. In total, blood, follicular fluid (FF), and corpus luteum (CL) samples were collected from 55 cows and 87 ewes.

Serum samples were subjected to the Microscopic Agglutination Test (MAT), while ovarian structures were analyzed by PCR targeting the lip L32 gene. By MAT, 22/55 cows (40.0%) and 50/87 ewes (57.5%) presented anti- *Leptospira* spp. antibodies. A predominance of the Autumnalis (40.0%) and Sejroe (25.0%) serogroups was observed in cattle, whereas Sejroe (31.4%) predominated in sheep. Notably, molecular analysis revealed *Leptospira* spp. DNA in 2/55 (3.6%) CL samples from cows and in 19/87 (21.8%) CL and 8/87 (9.2%) FF samples from ewes, representing the molecular evidence of the agent in these ovarian compartments in naturally exposed ruminants. The detection of *Leptospira* spp. DNA suggests that the agent or its genetic material may reach temporary ovarian structures involved in reproductive physiology, however, the viability of the bacterium and its functional consequences remain to be determined.

LANGUAGE OF ORIGINAL DOCUMENT: English

Mulyani G.T., Widiastih D.A., Primatika R.A.

**Clinical and sero-diagnosis of feline leptospirosis in the sleman region of Yogyakarta, Indonesia**

(2026) Open Veterinary Journal, 16 (2), pp. 834 - 840

DOI: 10.5455/OVJ.2026.v16.i2.7

**ABSTRACT:** Background: Leptospirosis is a zoonotic disease caused by pathogenic *Leptospira* spp., which can infect a wide range of mammalian hosts. Transmission to humans occurs not only from rodents and wildlife but also from companion animals, such as cats, living in close contact with humans. The occurrence and clinical expression of leptospirosis in animals vary according to species, age, immune status, and serovar infection. In this context, cats may represent an underrecognized component in the epidemiology of leptospirosis in endemic areas. Aim: This study aimed to estimate the seroprevalence of leptospirosis in cats, identify circulating *Leptospira* serovars, and descriptively characterize clinical signs and selected renal and hepatic laboratory findings in naturally exposed cats in Sleman Regency, Indonesia. Methods: A total of 116 pubertal cats from Sleman Regency, Special Region of Yogyakarta, Indonesia, were clinically examined. Three millilitres of blood were collected for the MAT, routine hematology, and biochemical analyses, including renal biomarkers [blood urea nitrogen (BUN), creatinine, symmetric dimethylarginine, hepatic biomarkers alanine aminotransferase (ALT), aspartate aminotransferase (AST), total bilirubin, albumin, and globulin], and the inflammatory marker feline serum amyloid A (fSAA). Leptospirosis was diagnosed at a MAT titer  $\geq 1:100$  against 14 *Leptospira* serovars. The seropositivity or infection rate was calculated as the proportion of MAT-positive samples, which represents prior exposure or infection rather than clinical disease. Results: Of the 116 cats, 12 (10.34%) were seropositive for leptospirosis. Serovar Bataviae was predominant (83.34%), while Ballum and Icterohaemorrhagiae each accounted for 8.33%. Most seropositive cats (66.67%) were clinically normal at the time of sampling, whereas 25% showed nonspecific signs such as anorexia, fever, icterus, lethargy, vomiting, or diarrhea. One cat (8.33%) presented with clinical signs consistent with renal involvement. The hematological parameters were within the reference ranges in more than half of the seropositive cats (58.33%), whereas leukocytosis indicative of inflammation was observed in 25% and mild anemia in 16.67%. Renal biomarkers (BUN, creatinine) remained within the reference intervals in 91.67% of seropositive cats, indicating minimal renal involvement at the time of sampling. Hepatic alterations were more frequently observed, with elevated ALT and AST levels in 25% of cats and increased total bilirubin or altered albumin-to-globulin ratios in 41.67% of cats. Elevated fSAA concentrations were detected in 33.33% of seropositive cats, indicating subclinical inflammatory responses. Conclusion: This study demonstrates the presence of feline leptospiral exposure in Sleman Regency, with a seroprevalence of 10.34%, predominantly associated with

*Leptospira interrogans* serovar Bataviae. Although most infections were subclinical, variation in clinical and laboratory findings among seropositive cats highlights the heterogeneous nature of feline leptospirosis. The detection of pathogenic serovars in outwardly healthy cats indicates an epidemiological role for cats as subclinical carriers, underscoring the need for surveillance and the integration of feline leptospirosis monitoring within a One Health framework.

LANGUAGE OF ORIGINAL DOCUMENT: English

López J.P., Salgado C.A., Morales C.D.

**Acute pancreatitis due to *Leptospira* spp.: an uncommon case report of a common zoonosis [Pancreatitis aguda por *Leptospira* spp.: un informe de caso poco común de una zoonosis común]**

(2026) *Biomedica*, 46 (1), pp. 18 - 24

DOI: 10.7705/biomedica.7771

**ABSTRACT:** Leptospirosis, a widespread zoonotic disease prevalent in tropical and subtropical regions, causes over one million cases and about 59,000 deaths annually. It is transmitted through contact with infected animal urine, primarily from rodents, and worsened by poor sanitation and favorable climate. Although in Colombia there was a significant decline in cases from 2018 to 2022, severe forms of the disease, including rare complications like acute pancreatitis, still pose significant health risks. A 49-year-old male presented with symptoms including abdominal pain, jaundice, and severe thrombocytopenia. Despite initial normal tests, leptospirosis was eventually diagnosed after further testing revealed elevated lipase levels and medical imaging confirmed severe pancreatitis. The patient received antibiotics and intensive care, which led to recovery and confirmation of leptospirosis through serology. Leptospirosis can cause severe multi-organ complications, including rare cases of pancreatitis. This case underscores the need for early diagnosis and treatment of leptospirosis to manage such complications effectively. Environmental factors and rodent control are crucial for prevention, emphasizing the importance of comprehensive management and preventive measures.

LANGUAGE OF ORIGINAL DOCUMENT: English

Labana R.V.

**Rethinking leptospirosis prevention, the Philippines**

(2026) *Emerging Infectious Diseases*, 32 (3), pp. 397 - 403

DOI: 10.3201/eid3203.251250

**ABSTRACT:** Leptospirosis, the disease caused by infection with *Leptospira* spp. bacteria, remains a recurring public health challenge in the Philippines, particularly during monsoon floods and typhoon seasons. Despite responsive measures, such as Code White Alerts, standardized treatment protocols, and postflood prophylaxis, cases and associated deaths persist, emphasizing the limitations of reactive strategies. Structural challenges in flood control, urban sanitation, and rodent management hinder long-term prevention. This policy review applies a systems thinking approach to integrate national programs with community-led interventions, recognizing the interlinked roles of environmental management, behavioral change, and grassroots surveillance. Low-cost, context-sensitive actions, such as community drainage clearing, shared protective gear, local rodent-proofing, and barangay-level reporting, can address immediate risks while reinforcing structural initiatives. Embedding those actions within a feedback loop between local actions and national

policies fosters resilience, reduces disease incidence, and shifts the paradigm from reactive response to sustainable prevention.

LANGUAGE OF ORIGINAL DOCUMENT: English

de Souza Rocha K.N., de Azevedo Santos S., de Oliveira J.P.F., Bezerra Rocha M.A., de Melo Almeida M., de Medeiros Delfino G.L., de Souza Oliveira K.N., da Fonseca Fernandes A.R., Fonseca M.A., dos Santos Higino S.S.

**Occupational and non-occupational aspects of leptospirosis among workers in a public slaughterhouse in the semi-arid region, Paraíba state, Brazil**

(2026) Discover public health, 23 (1), art. no. 445

DOI: 10.1186/s12982-026-01848-8

**ABSTRACT:** This cross-sectional analytical study investigated occupational and non-occupational determinants of leptospirosis among 42 workers at a municipal public slaughterhouse located in the semi-arid region of Paraíba State, Brazil. The facility, classified as mixed-type, processes bovine, swine, ovine, and caprine species under municipal sanitary inspection. Epidemiological data included age, education level, household income, residential infrastructure, job function, length of service, and PPE use/hygiene, along with blood and urine samples for diagnostic testing by MAT and PCR. Descriptive statistics and the Chi-square test assessed associations. Participants were predominantly male (aged 40–49), with low income and education, residing near the facility. Of the total, 88% (n = 37) performed activities involving direct animal contact, such as stunning, bleeding, skinning, and evisceration, while 12% (n = 5) held administrative positions. MAT revealed seroreactivity in 8 workers (19%), with reactions to the Australis, Cynopteri, Pomona, Panama, and Pyrogenes serogroups; all PCR results were negative. The slaughterers (especially those involved in stunning, bleeding, skinning, and evisceration) were the only group among the evaluated workers to present anti-*Leptospira* agglutinations, indicating they faced the highest risk of contamination. Occupational factors (job type/turnover, tenure, PPE use/hygiene, infrastructure, rodents/stray dogs, slaughtered species, smoking) and non-occupational factors (housing sanitation, animal husbandry, water quality, wild meat consumption, disease knowledge) could be associated with increased infection risk. These findings highlight leptospirosis as a major occupational zoonosis in the meat industry, requiring an integrated sanitary and public health approach. Key measures include improved sanitation, proper PPE use, safe handling, environmental monitoring, effluent treatment, enhanced animal inspection, and educational initiatives.

LANGUAGE OF ORIGINAL DOCUMENT: English

Bertani M.J.A., Santos Lima E., da Cunha Nobrega N., Sansone M., Garcia Alves J., Leite D., de Souza Oliveira G., de Arruda Santos T., Polatto R., Romero Calo E., de Andrade Sueli T., Campos Rodrigues K., Santos M.B.N., Sacchi Tavares C., Heinemann M.B., Casas Ribeiro Tiba M., Camargo C.H., Blanco Morozetti R.

**Application of FT-IR spectroscopy using the IR Biotyper® for *Leptospira*: protocol optimization and first spectral insights**

(2026) European Journal of Clinical Microbiology and Infectious Diseases

DOI: 10.1007/s10096-026-05507-3

**ABSTRACT:** Purpose: This study aimed to optimize a Fourier Transform Infrared (FT-IR) based protocol using the IR Biotyper® system for *Leptospira* strains and to provide the first spectral insights supporting its feasibility for serogroup and serovar differentiation. Methods: Reference *Leptospira* strains were cultured in

Ellinghausen–McCullough–Johnson–Harris medium. A sample preparation workflow was optimized to accommodate liquid cultures, including chemical and thermal inactivation protocols to ensure biosafety. FT-IR spectra were acquired using the IR Biotyper® spectrometer and analyzed by Principal Component Analysis (PCA) in the 1300–800 cm<sup>-1</sup> spectral region. Whole Genome Sequencing (WGS) was used as the reference approach for taxonomic confirmation. Identification and serovar differentiation from genomic data were performed using the jSpecies, KmerFinder, and Pathogenwatch platforms. Results: The sample preparation methods tested produced spectra suitable for analysis while ensuring biosafety. Spectral acquisition showed good reproducibility for most serovars across technical and biological replicates. Analysis of WGS performed using the jSpecies platform successfully differentiated the two major human-pathogenic serovars, Icterohaemorrhagiae and Copenhageni, whereas other bioinformatics tools showed limitations. PCA of FT-IR spectra generated by the IR Biotyper® demonstrated promising discriminatory potential among the serovars and serogroups evaluated, including closely related serovars such as Icterohaemorrhagiae and Copenhageni and serovars within the Australis and Sejroe serogroups. Conclusion: The IR Biotyper offers a rapid FT-IR approach for *Leptospira* typing. Under the experimental conditions evaluated, the method allowed differentiation of some serovars. Although preliminary, these findings suggest that FT-IR may represent a promising complementary tool for epidemiological surveillance of leptospirosis.

LANGUAGE OF ORIGINAL DOCUMENT: English

Dubniewicz K., Pardyak L., Walczak P., Pietsch-Fulbiszewska A., Gurgul A., Jasielczuk I., Szmatoła T., Arent Z.J.

**Divergent fates of Hardjo leptospire: early transcriptomic response of *Leptospira interrogans* in an ovine dialysis membrane chamber model**

(2026) *Transboundary and Emerging Diseases*, 2026 (1), art. no. 2998023

DOI: 10.1155/tbed/2998023

**ABSTRACT:** *Leptospira interrogans* serovar Hardjo and *Leptospira borgpetersenii* serovar Hardjo are major bovine- and ovine-adapted pathogens that differ markedly in genome content. To investigate early events during host exposure, we compared the survival of both species using an ovine peritoneal dialysis membrane chamber (DMC) model, which exposes leptospire to simultaneous nutrient restriction, temperature and osmotic shifts and small host-derived immune factors such as antimicrobial peptides (AMPs). *L. borgpetersenii* failed to survive 24 h of in vivo exposure, whereas *L. interrogans* persisted and remained viable. RNA sequencing of two *L. interrogans* strains revealed extensive transcriptional reprogramming, with 1066 differentially expressed genes (DEGs). Early host exposure triggered coordinated remodelling of membrane-associated proteins, including strong induction of adhesins (LigA/B and LenC/F) and other lipoproteins, accompanied by metabolic reprogramming that redirects cellular resources towards conservation and membrane reorganisation. Iron-related genes were also differentially regulated, and *L. borgpetersenii* showed reduced survival under in vitro iron-limiting conditions. A substantial proportion of downregulated genes belonged to pathways governing signal transduction, chemotaxis and motility, indicating early suppression of selected sensory and locomotive functions. Many of the genes most strongly regulated under experimental stress conditions lack orthologues in the *L. borgpetersenii* genome, suggesting that genome reduction has eliminated factors required for survival of the stressors encountered in this model, which further implies that this species relies on distinct early-phase survival strategies that do not support extracellular persistence under the conditions tested. Our findings show that *L. interrogans* serovar Hardjo rapidly modulates cellular networks to promote early survival in body fluids or within the extracellular matrix.

LANGUAGE OF ORIGINAL DOCUMENT: English

Arent Z.J.

**Leptospira**

(2025) Diseases of Swine, Twelfth Edition, pp. 1023 - 1033

DOI: 10.1002/9781394179466.ch52

ABSTRACT: Leptospirosis is a global disease of swine with significant economic impact and is an important zoonosis. The disease is caused by pathogenic spirochetes of the genus *Leptospira*. The *Leptospira* serogroups most commonly associated with infection of pigs are the Pomona, Australis, and Tarassovi groups, and include strains maintained by pigs, but all of which have alternative wildlife maintenance hosts. Significant incidental infections include strains belonging to the Grippotyphosa, Icterohemorrhagiae, and Canicola serogroups. Leptospire persist in the kidneys and female and male genital tracts of carrier swine and are excreted in urine and genital fluids. Survival outside the host is favored by warm, moist conditions. Transmission is by direct or indirect contact with a carrier pig or other animal. Interruption of transmission from infected pigs or other hosts to susceptible pigs is the critical factor in control.

LANGUAGE OF ORIGINAL DOCUMENT: English

Silva J., Rivero M., Scialfa E., Caimi K.

**Study of *Leptospira* spp. in rodents and water sources: implications for public health in rural environments from Buenos Aires province, Argentina**

(2026) Pathogens and Global Health

DOI: 10.1080/20477724.2026.2655726

ABSTRACT: Leptospirosis, a zoonotic disease caused by *Leptospira* spp. poses significant public health and economic challenges. Its transmission is favored in interface environments where wild and synanthropic rodents acting as maintenance hosts contaminate surroundings with urine. Additionally, water sources can harbor leptospire, serving as an infection risk for humans and animals. This study aimed to investigate the presence of *Leptospira* spp. in surface and underground water resources, detect leptospire in wild and synanthropic rodents, and identify/genotype isolation in rural environments from Tandil county, Argentina. Thirty-five water samples and kidney samples from 30 rodents were collected. *Leptospira* spp. Isolation was attempted via culture in a selective EMJH-STAFF medium with observations made through fluorescence microscopy. Growth of leptospire was observed in one rodent kidney tissue sample. The presence of a pathogenic *Leptospira* strain was confirmed by 16S rRNA PCR and subsequently genotyped by MLST. Notably, this represents the first isolation of *Leptospira interrogans* serogroup Canicola allelic profile ST3 from *Akodon Azarae* in Argentina, making a significant epidemiological finding for the region. While *Leptospira* spp. was not detected in the analyzed water samples, the isolation of *L. interrogans* highlights the role of wild rodents as persistent reservoirs in the rural–urban interface. This finding suggests that the transmission dynamics may involve a more complex network of wild reservoirs, highlighting the potential public health risk to local inhabitants and domestic animals.

LANGUAGE OF ORIGINAL DOCUMENT: English

Palma F.A.G., Ruiz Cuenca P., Khalil H., Brito Lustosa P., das Virgens Nascimento Reis M., Arouca Guerreiro M., Santos Mota A., de Oliveira Santos D., Lòpez Alzete Y.A., de C. Santiago D.C., Begon M., Giorgi E., Costa F., Lustosa R.

**Collaborative mapping: perceived environmental risk of leptospirosis in urban communities in Salvador, Brazil**

(2026) PLOS Global Public Health, 6 (4 April), art. no. e0006113

DOI: 10.1371/journal.pgph.0006113

**ABSTRACT:** Environmental risks disproportionately affect socially vulnerable populations, yet most studies on urban leptospirosis have not captured residents' perceptions of these risks. We conducted a cross-sectional study between August 2018 and March 2019 across four communities in Salvador, Brazil (Marechal Rondon, Alto do Cabrito, Nova Constituinte, and Rio Sena) using a collaborative mapping approach to explore residents' perceptions of environmental health risks. The majority of participants identified sewage as the primary health risk (26–39% across communities), followed by garbage (22–28%), while leptospirosis itself was perceived as a high-risk problem by very few participants (0–4%). We found no spatial concordance between areas perceived as high risk for leptospirosis and households testing positive for the disease, nor between areas perceived as high rat risk and the locations of positive rat traps and track plates. However, a higher density of rubbish piles was observed in areas residents identified as high rubbish risk, suggesting that perceptions do reflect some on-the-ground realities. Collaborative mapping proved an effective method for capturing individual perceptions of environmental health risks and promoting community participation in generating locally relevant information. The disconnect between perceived and actual transmission risk may reflect that residents are more attuned to the broader social and environmental determinants of leptospirosis, such as sanitation and waste, than to the disease itself, a distinction that warrants further investigation to better integrate community knowledge into disease prevention and control strategies.

LANGUAGE OF ORIGINAL DOCUMENT: English

Budiati R.E., Hadisaputro S., Adi M.S., Djati R.A.P., Suhartono, Ramadhani T.

**Integrated socio epidemiological model for leptospirosis control in Tidal Flood Prone areas**

(2026) Kemas, 21 (3), pp. 639 - 646

DOI: 10.15294/kemas.v21i3.34323

<https://www.scopus.com/pages/publications/105035863914?origin=resultlist>

**ABSTRACT:** The Elderly populations in tidal flood-prone areas face heightened vulnerability to leptospirosis due to environmental hazards, recurrent inundations, and psychosocial stressors. This study analyzed an integrated socio-epidemiological model that accommodates a community-based intervention, targeting perceived stress, self-efficacy, and clean and healthy living behavior (PHBS), along with a system dynamics simulation to forecast leptospirosis incidence. This quasi-experimental study design was implemented with 70 participants (35 intervention and 35 control). The participants reside in flood-affected villages of Demak Regency, Indonesia, in 2024 (Purwosari, Sriwulan). Perceived stress (PSS-10), self-efficacy, and PHBS scores were measured at pre-and post-intervention. Statistical analyses included Mann-Whitney, Wilcoxon, and paired t-tests. Delta scores were integrated into a stock-flow model (PowerSim Studio 10) incorporating behavioral and environmental risk variables to simulate leptospirosis cases for 2024–2029. The intervention group demonstrated significant improvements in self-efficacy ( $\Delta=+5.69\pm 8.17$ ,  $p<0.001$ ) and PHBS

( $\Delta=+9.37\pm 4.59$ ,  $p<0.001$ ), alongside a non-significant but clinically relevant reduction in perceived stress ( $\Delta=-7.20\pm 8.33$ ,  $p=0.733$  vs control). The dynamic model projected a 25–30% reduction in leptospirosis cases over five years with intervention, compared to a  $\leq 5\%$  decline without behavioral programs. Visual validation indicated alignment between simulated and real incidence trends (2020–2024). Integrating psychosocial behavioral interventions with dynamic modeling provides a reliable framework for leptospirosis control in flood-prone populations.

LANGUAGE OF ORIGINAL DOCUMENT: English

Sun X., Yang J., Li J., Ni Z., Xie H.

**Epidemiological and clinical characteristics of leptospirosis in Wenzhou City from 2019 to 2023 [2019—2023**

(2025) Chinese Journal of Endemiology, 44 (11), pp. 906 - 912

DOI: 10.3760/cma.j.cn231583-20250113-00028

**ABSTRACT:** Objective To analyze the epidemiological and clinical characteristics of leptospirosis in Wenzhou City, and to provide a scientific basis for formulating prevention and control strategies of leptospirosis in Wenzhou City. Methods Information on leptospirosis case from 2019 to 2023 was collected from the China Information System for Disease Control and Prevention. Descriptive epidemiological methods were used to analyze the three-dimensional distribution and clinical manifestations of leptospirosis. Results From 2019 to 2023, the annual average incidence rate of leptospirosis in Wenzhou City was 0.43/100 000, and the annual average mortality was 0.01/100 000. The incidence rate was the highest in 2021 (0.74/100 000), and there was a statistically significant difference in the incidence rate over the five years ( $\chi^2 = 35.48$ ,  $P < 0.001$ ). Cases were reported in all regions in Wenzhou City except for Dongtou District and Longgang City, with Yongjia County had the highest number of cases (114 cases). The impact rate of streets/townships was 35.14% (65/185), among them Yongjia County had the highest impact rate of steets/townships (86.36%, 19/22). The onset season was from August to October (88.83%, 159/179), with a male to female ratio of 4.97 : 1.00 (149/30). The age group of 61 - 70 years old was the most affected (39.66%, 71/179), and farmers were the main occupation (70.95%, 127/179). Twenty-six point eighty-two per cent (48/179) of the cases had a clear history of animal contact within one month before onset, and 68.16% (122/179) had a history of contact with contaminated water. The main clinical type was influenza-typhoid type (23.46%, 42/179), with the main clinical manifestations being fever (84.92%, 152/179), chills (55.87%, 100/179), and fatigue (62.57%, 112/179). Twelve point twenty-nine per cent 12.29% (22/179), 8.38% (15/179), and 22.91% (41/179) of cases showed conjunctival congestion, lymph node enlargement, and gastrocnemius muscle tenderness, respectively. Clinical outcomes showed that 73.74% (132/179) of the cases recovered or improved, and 3 cases died. Conclusions From 2019 to 2023, the overall prevalence of leptospirosis in Wenzhou City is at a low level, but there are deaths that need to be taken seriously. In order to control the disease, continuous monitoring should be carried out, health education for relevant populations should be strengthened, and the risk of leptospirosis should be reduced.

LANGUAGE OF ORIGINAL DOCUMENT: English

Dorri R., Mohammadi E., Golchin M.

**Molecular detection of Leptospira infection in the Iranian dromedary camel population of South Kerman, Iran**

(2026) Iranian Journal of Veterinary Medicine, 20 (2), pp. 389 - 394

DOI: 10.32598/ijvm.20.2.1005668

**ABSTRACT:** Background: Leptospirosis is a zoonotic disease with global distribution. A wide variety of mammals, including camels, are affected by this disease. The most important complications of this disease comprise a severe drop in production, abortion, and kidney damage. The climatic conditions of southern Kerman Province in Iran, combined with the significant presence of camels, underscore the need for evaluating Leptospirosis in camels in this region. Objectives: This study aimed to detect the presence of *Leptospira* bacteria in the camel population of South Kerman Province, Iran, using molecular methods. Methods: For this purpose, 100 blood samples were taken from the jugular veins of seemingly healthy camels in the south of Kerman to perform molecular techniques. Then, the DNA from the samples was extracted using a DNA extraction kit, following the manufacturer's instructions. In the following, a polymerase chain reaction (PCR), technique using specific primers targeting the 16S rRNA gene of *Leptospira interrogans* was employed to detect *Leptospira* bacteria. Results: The DNA of the *Leptospira* bacterium was found in 5 out of 100 camel blood samples (5%) using the PCR molecular technique. Conclusion: This study demonstrated that the *Leptospira* bacterium is present in the apparently healthy camel population in southern Kerman. Considering the ever-increasing use of camel meat and dairy products in humans, as well as the resulting economic losses in the country's livestock industry, this finding can serve as a warning to the Ministry of Health and Medical Education of Iran.

LANGUAGE OF ORIGINAL DOCUMENT: English

Fernandes L.G.V., Putz E.J., Nally J.E.

**The *Leptospira* immunoglobulin-like protein LigB from *Leptospira borgpetersenii* serovar Arborea is not required for either acute or chronic infection**

(2026) *Infection and immunity*, 94 (4), pp. e0066225

DOI: 10.1128/iai.00662-25

**ABSTRACT:** Leptospirosis is a globally important zoonotic disease caused by more than 40 pathogenic *Leptospira* spp. that are responsible for more than 1 million human cases and almost 60,000 deaths annually. The disease also affects many companion, domestic, and wild animal species. Leptospiral immunoglobulin-like proteins (Lig), particularly LigA and LigB, are well-established surface membrane proteins that have been extensively studied due to their interactions with the host immune system. Silencing expression of both ligA and ligB in *L. interrogans* serovar Copenhageni results in attenuation of virulence, confirming their role as virulence factors. To examine the role of Lig proteins in other pathogenic species of *Leptospira*, we applied the CRISPR-Prime Editing (CRISPR-PE) strategy to engineer a one-nucleotide frameshift deletion in ligB, generating a knockout mutant in *L. borgpetersenii* serogroup Ballum serovar Arborea strain LR131, a pathogenic species that lacks ligA. Despite a complete loss of LigB expression, the mutant strain maintained its ability to cause acute lethal infection in hamsters and the ability to establish renal colonization in rats. These findings demonstrate that ligB alone is dispensable for both acute and chronic infection in the *L. borgpetersenii* strain LR131 background. This work represents the first targeted disruption of ligB in *L. borgpetersenii* as facilitated by CRISPR-PE and prompts a reevaluation of LigB as a universal virulence determinant in different genetic backgrounds. These insights are critical for advancing our understanding of leptospiral pathogenesis and guiding the design of broadly protective subunit vaccines.

LANGUAGE OF ORIGINAL DOCUMENT: English

Stagnoli A., House R.V., Dohmann K., Prüser T.F., Geuthner A.-C., Albrecht C., Pfeffer M.

**Wild Boar (*Sus scrofa*) as reservoir of pathogenic and intermediate *Leptospira***

(2026) *Animals*, 16 (7), art. no. 1025

DOI: 10.3390/ani16071025

**ABSTRACT:** Leptospirosis is a globally widespread zoonosis, with wildlife species playing a key role in the maintenance and environmental dissemination of *Leptospira* spp. Wild boar (*Sus scrofa*) are increasingly recognized as potential reservoir; however, molecular data on renal carriage of *Leptospira* spp. in Europe and particularly in Germany, remain scarce. In this study, 1281 wild boar kidney samples collected in the federal state of Saxony-Anhalt were analyzed by real-time PCR to investigate the presence of pathogenic and intermediate *Leptospira* DNA. Pathogenic *Leptospira* DNA was detected in 3.1% (95% CI = 2.3–4.2) of the samples, whereas intermediate *Leptospira* DNA was identified in 0.6% (95% CI = 0.3–1.2). Pathogenic *Leptospira* showed a widespread distribution across the study area, with a significantly higher prevalence in the district of Salzlandkreis ( $p = 0.04$ , OR = 3.4, CI = 0.8–10.3). Evaluation of host-related and environmental factors revealed a significant association between pathogenic *Leptospira* DNA detection and both sub-adult age class ( $\chi^2 = 13.1$ , df = 2,  $p = 0.0014$ ) and autumn season ( $\chi^2 = 12.3$ , df = 3,  $p = 0.0066$ ), whereas no significant association was observed for sex. Neither of these factors showed a significant relation with intermediate *Leptospira* spp. Sequence analyses of *rrs* and 16S rRNA genes predominantly identified as *L. interrogans* (62.5%), followed by *L. borgpetersenii* (20.0%) and *L. kirschneri* (5.0%). All intermediate *Leptospira* sequences were identified as *L. fainei*. Notably, this study provides the first molecular evidence of intermediate *L. fainei* DNA in wild boar kidneys in Germany. Overall, these findings suggest that wild boar may act as renal carriers of *Leptospira* spp. and support their potential relevance in the epidemiology of leptospirosis within wildlife populations in Saxony-Anhalt.

LANGUAGE OF ORIGINAL DOCUMENT: English

Perera N., Gunawardena C., Abeyratne V., Rajapakse P., Semina T., Uluwattage W., Ratnayake A., Mendis S., Dickmadugoda N., Majaheith M., Karunanayake L., Ranawaka U.K.

**Neuroleptospirosis in patients presenting with primary central nervous system infection: a multicentre study**

(2026) *PLoS neglected tropical diseases*, 20 (4), pp. e0014183

DOI: 10.1371/journal.pntd.0014183

**ABSTRACT: BACKGROUND:** Leptospirosis is well-known to cause neurological involvement. However, data on the frequency of neuroleptospirosis as a cause of primary central nervous system (CNS) infections is sparse. **METHODOLOGY/PRINCIPAL FINDINGS:** An observational study was conducted in three regions in Sri Lanka between October 2021-March 2024. Patients with a primary diagnosis of meningitis, meningoencephalitis or encephalitis were recruited. Blood and cerebrospinal fluid (CSF) were analysed for pathogenic *Leptospira* DNA by real-time PCR, and serology by microscopic agglutination test (MAT) on admission and after 10-14 days. A confirmed case was a patient with evidence of CNS infection with positive CSF or blood PCR and/or 4-fold rise/single titre  $\geq 1:320$  in MAT. A total of 100 patients were studied with a median age of 55 (IQR 39.7 - 69.7) years and 52 (52%) males. Suspected clinical diagnoses were meningitis ( $n = 66,66\%$ ), meningoencephalitis ( $n = 22,22\%$ ) and encephalitis ( $n = 12,12\%$ ). Eleven (11%) patients were laboratory-confirmed as neuroleptospirosis; meningitis ( $n = 3$ ), meningoencephalitis ( $n = 3$ ), encephalitis ( $n = 5$ ). Three patients had positive blood *Leptospira* PCR, one had positive blood and CSF *Leptospira* PCR, three had high initial MAT and four had a 4-fold rise in MAT. Neurological manifestations included headache

(n = 8), seizures (n = 2), confusion (n = 7), photophobia (n = 4), neck stiffness (n = 6) and limb weakness (n = 5). Majority of patients with positive blood or CSF PCR for *Leptospira* (n = 3, 75%) did not have a CSF cellular reaction. The neuroleptospirosis group had a lower requirement for intensive care compared to other CNS infections (9% vs 13.5%) and recovered without residual neurological disability. There were no deaths in the neuroleptospirosis group compared to 11 (12.4%) deaths in other CNS infections. CONCLUSIONS: Leptospirosis is an important cause of primary CNS infections, and may lead to more favourable outcomes. It is important to consider leptospirosis as an aetiological agent in the laboratory workup of primary CNS infections in leptospirosis-prevalent settings.

LANGUAGE OF ORIGINAL DOCUMENT: English

Budaeva S.E., Breneva N.V., Kisileva E.Y., Sharakshanov M.B., Timoshenko A.F., Rudakov D.M.

**The impact of floods on the leptospirosis outbreak in the Irkutsk region**

(2026) *Acta Biomedica Scientifica*, 11 (1), pp. 248 - 256

DOI: 10.29413/ABS.2026-11.1.24

ABSTRACT: Background. In 2019, because of the past large-scale flood in the Irkutsk region, the infrastructure of eight municipal districts was destroyed. In the affected territory – Nizhneudinsky district, observations were made on the natural focus of leptospirosis. The aim. To assess the impact of the flood on the natural focus of leptospirosis. Materials and methods. Small mammals (SM) were counted and captured in floodplain-marsh and forest-shrub stations. In 2012, 2014, 2019, 2021–2023, 493 SM individuals were captured. Biological material from humans and animals was examined using molecular biological and serological methods. Results. During the flood, the activity of the focus was significantly reduced, and in 2021–2022, an increase in the number (up to 22.0 % of hits per 100 l/s) and infection rate (up to  $14.0 \pm 5.3$  %) of carriers in the focus was detected. In addition, agricultural and domestic animals can become a source of infection; for example, up to  $90.0 \pm 6.7$  % of unvaccinated livestock have antibodies to leptospires. The high seroprevalence of the population (up to  $20.0 \pm 5.7$  %) indicates sporadic contacts with the infection. Conclusion. The flood of 2019 contributed to a temporary decrease in the activity of the natural focus of leptospirosis, but later, there was a tendency for the epizootic situation to worsen. Therefore, preventive measures are necessary.

LANGUAGE OF ORIGINAL DOCUMENT: English

Laxman, Kumar R.

**Mathematical modeling of acute and chronic leptospirosis transmission considering multiple susceptibility risk**

(2026) *Comparative Immunology, Microbiology and Infectious Diseases*, 127, art. no. 102468

DOI: 10.1016/j.cimid.2026.102468

ABSTRACT: Leptospirosis is an emerging zoonotic disease that poses significant public health and economic challenges. In this paper, we analyze the dynamics of leptospirosis disease considering acute and chronic leptospirosis transmission with varying level of risk. We analyzed the qualitative behavior of the model, focusing on the positivity and boundedness of the system. To assess how well the model represents reality, we calibrated it using actual leptospirosis case data from Kerala, spanning from June 2022 to December 2023. This calibration guarantees that the model provides a faithful and dependable representation of the epidemiological dynamics observed in the specified region over the given time-frame. A comprehensive global stability analysis is carried out for the disease-free state of the proposed model, with respect to the basic

reproduction number (R0). The normalized forward sensitivity analysis of R0 indicates that reducing the disease transmission rates is critical for effective disease control. In addition, sensitivity and uncertainty analyses are performed to determine the most influential parameters governing disease transmission. The Partial Rank Correlation Coefficient (PRCC) approach supported by scatter plot visualization, is employed to evaluate and illustrate the global sensitivity of the model parameters. Our numerical simulations suggest that the high-risk population is particularly vulnerable to both acute and chronic leptospirosis infections, exhibiting higher infection peaks and prolonged disease persistence.

LANGUAGE OF ORIGINAL DOCUMENT: English

Barnekow T., Schablon A., Kleinmüller O., Nienhaus A.

**Prevalence of antibodies against hantavirus, *Leptospira*, lymphocytic choriomeningitis virus and *Chlamydia psittaci* in pest control workers in Germany – a cross-sectional study**

(2026) Journal of Occupational Medicine and Toxicology , 21 (1), art. no. 15

DOI: 10.1186/s12995-026-00503-x

**ABSTRACT:** Background: Pest control workers may be exposed to zoonotic pathogens during their work, yet data on the prevalence of zoonotic infections in this occupational group in Germany is scarce. This study investigated the seroprevalence of antibodies against four pathogens commonly transmitted by rodents and pigeons among pest control workers in Germany. Methods: Blood samples of participants were analysed for antibodies against hantavirus, *Leptospira*, lymphocytic choriomeningitis virus (LCM virus) and *Chlamydia psittaci*. Additional data was collected using a questionnaire. Results: Among the 154 participants, five were seropositive for hantavirus (3.2%), seven for *Leptospira* (4.6%) and two for *Chlamydia psittaci* (1.5%). No participants tested positive for LCM virus. Seropositive participants were mostly male (85.7%), aged 31–63 years and were predominantly engaged in field service pest control activities (85.7%). Both highly experienced (> 20 years of experience) and fairly inexperienced (< 1 year of experience) workers were affected. Notably, 42.9% of seropositive participants reported no or only occasional occupational exposure to the respective reservoir species. Most reported only occasional use of personal protective equipment (57.1%). Self-rated knowledge of zoonotic diseases was most commonly rated as moderate (50.0%) or good (42.9%). Conclusion: Seroprevalence of antibodies against hantavirus, *Leptospira*, LCM virus, and *Chlamydia psittaci* was low among pest control workers in Germany. This may be indicative of effective infection control in this occupational group. Workers should receive intensified, regular training to further strengthen their knowledge of zoonotic diseases and improve adherence to precautionary measures.

LANGUAGE OF ORIGINAL DOCUMENT: English