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Zeppelini Caio C., da Paixão Barreto Borges A.M., Santiago D.C.C., Alves R.S., Santo Espírito V.F., Rangel Lacorte C., de Oliveira Carvalho R., de Oliveira D., Carneiro I.O., Bazan L., Eyre M., Costa F., Begon M., Khalil H.

Differences in ecological drivers for *Leptospira* and Hantavirus in an urban Norway rat population

(2026) EcoHealth

DOI: 10.1007/s10393-026-01836-z

ABSTRACT: Rodent control in urban areas is an important public health measure, among other reasons, for their capacity of harboring several zoonotic pathogens. Efficient, evidence-based control programs must consider both rodent and pathogen ecology, to achieve both rodent population and pathogen transmission risk reduction. The present study aims to determine the ecological drivers of *Leptospira* and Hantavirus positivity in an urban Norway Rat population. One hundred and twenty rats were trapped in four urban poor communities in Salvador, Brazil, tested for *Leptospira* sp. and Hantavirus. Generalized Linear Models for *Leptospira* (N=109) and Hantavirus (N=108) positivity were created with a pool of environmental and demographic variables, followed by stepwise model selection using Akaike's Information Criterion. Age, presence of *Calodium hepaticum* scars, wounds, accumulated materials, open sewer canals and unpaved soil were positively associated with *Leptospira* positivity. Age and presence of accumulated materials were positively associated with Hantavirus positivity, while rodent control campaigns and being male were protective factors. Factors associated with positivity for *Leptospira* are also associated with rodent infestation. Different subsets of environmental and demographic factors influence pathogens with different epidemiological characteristics. Control measures that effectively reduce zoonotic risk must consider the ecological characteristics of the pathogens present in the system.

LANGUAGE OF ORIGINAL DOCUMENT: English

Gong M., Zhou Y., Chen S., Zhang C.

Temporal epidemiology and multi-source forecasting of hemorrhagic fever with renal syndrome and leptospirosis in mainland China: an interpretable machine learning study

(2026) Preventive Medicine Reports, 71, art. no. 103643

DOI: 10.1016/j.pmedr.2026.103643

ABSTRACT: Objective Hemorrhagic fever with renal syndrome (HFRS) and leptospirosis are environmentally associated zoonoses in China, yet their long-term temporal dynamics and predictive determinants have not been systematically compared. Methods We analyzed monthly surveillance data on reported cases of HFRS and leptospirosis in mainland China from January 2010 to December 2025 using a multi-source data-driven framework. Five statistical, machine-learning, and deep-learning models were evaluated using historical, socioeconomic, meteorological, ecological, and behavioral predictors. Results During the study period, 152,183 HFRS cases and 6288 leptospirosis cases were reported. HFRS declined significantly after 2019, whereas leptospirosis declined until 2018 and subsequently rebounded. Both diseases exhibited distinct seasonality, with HFRS peaking in late autumn and winter and leptospirosis in late summer and autumn. Extreme gradient boosting (XGBoost) with the combined predictor set achieved the best out-of-sample performance for both diseases. Shapley additive explanations identified 12-month-lagged incidence as the dominant predictor for both diseases, whereas precipitation and relative humidity contributed more strongly to leptospirosis than to HFRS. Conclusions HFRS and leptospirosis showed distinct epidemiological patterns and predictor contributions. Integrating multi-source predictors improved forecasting performance, while

interpretable machine learning provided disease-specific insights to support early warning and targeted prevention of environmentally associated zoonoses.

LANGUAGE OF ORIGINAL DOCUMENT: English

Moreira R.Q., Soares Mafra P., Ramos do Nascimento V., Manguiera Freire R.A., Pires Cabral B., de Araújo Libonati H., Fenelon Guimarães A.C., Lilenbaum W., Lima Monteiro Correia A.

Cross-sectional investigation of pathogenic *Leptospira* at the wildlife–livestock interface in a Cerrado–Atlantic Forest ecotone, Brazil

(2026) Tropical Animal Health and Production, 58 (8), art. no. 542

DOI: 10.1007/s11250-026-05345-7

ABSTRACT: Leptospirosis is a globally distributed zoonosis affecting domestic and wild species, particularly prevalent in regions with high temperature and humidity that favor leptospiral survival in the environment. This study investigated the role of wildlife–livestock interactions in the transmission cycle of *Leptospira* spp. Serum samples (for Microscopic Agglutination Test – MAT, considering dilutions $\geq 1:100$ with $\geq 50\%$ agglutination as reactive) and kidney tissues (for lipL32 PCR) were collected from 28 small mammals, including 14 marsupials and 14 rodents. All samples were seronegative by MAT; however, 15/28 (53.6%) kidney samples were PCR-positive, including 9/14 (64.3%) marsupials and 6/14 (42.9%) rodents. Additionally, 66 bovine serum samples from a dairy farm in the same area were analyzed by MAT, with 60/66 (90.9%) testing seropositive revealing high antibody titers (800), predominantly against serogroup Icterohaemorrhagiae (10%), followed by Sejroe (1.6%). Serogroup Pomona showed 1.6% of titers at 400. These findings suggest that small mammals might have played a significant role in the transmission and maintenance of pathogenic leptospires in the studied area, potentially acting as reservoirs and contributing to cattle infection. However, the observed infection patterns may also reflect indirect transmission routes, such as environmental persistence of leptospires in soil and water, or the involvement of additional, uninvestigated reservoir hosts within the agroecosystem. Therefore, small mammals sharing habitats with livestock should be considered important in leptospirosis epidemiology. Further studies evaluating leptospiral survival in environmental substrates, applying molecular typing to identify circulating strains, and conducting broader host surveillance are necessary to better elucidate transmission dynamics.

LANGUAGE OF ORIGINAL DOCUMENT: English

Lu X., Westman M.E., Griebisch C., Norris J.M., Ward M.P.

Longitudinal survey of pathogenic *Leptospira* species at a major park in Sydney, Australia

(2026) EcoHealth

DOI: 10.1007/s10393-026-01845-y

ABSTRACT: Since leptospirosis' re-emergence in Sydney, Australia, concerns about the risk of exposure to pathogenic *Leptospira* species at urban parks have risen. The current longitudinal environmental survey investigated the temporal detection of pathogenic *Leptospira* at a major recreational park and explored whether the presence of a flying-fox (*Pteropus* spp.) camp affects soil *Leptospira* detection. From February to October 2024, environmental samples and voided faecal samples (flying-fox faeces, and goose faeces as controls) were collected from Centennial Park, Sydney. The samples were tested by a diagnostic 16S rRNA TaqMan quantitative PCR (qPCR) assay, and time series of the monthly minimum cycle threshold (Ct) values were generated to assess cross-correlation. Over the nine-month study period, pathogenic *Leptospira* was

consistently detected in soil and water samples. Despite not being a known reservoir of *Leptospira*, three voided goose faecal samples tested qPCR-positive (Ct 38.22–38.84). There was no difference in qPCR results of soil collected from the flying-fox camp and another nearby location. The water Ct time series was not correlated with monthly precipitation, but was positively cross-correlated with the Ct time series of soil collected at the flying-fox camp one month prior. Overall, the results suggested temporal ubiquity of pathogenic *Leptospira* at this park. No direct evidence of flying-foxes' contribution to the environmental *Leptospira* burden at the park was uncovered, but mechanical movement of *Leptospira* between soil and water, and the role of birds as mechanical vectors, need further research.

LANGUAGE OF ORIGINAL DOCUMENT: English

Sansone Santos N.M., Boschiero Negri M., Marson Lima F.A.

Climate-sensitive infectious diseases in the context of climate change: lessons from Brazil's floods, with leptospirosis as an example

(2026) *Infectious Diseases Now*, 56 (7), art. no. 105347

DOI: 10.1016/j.idnow.2026.105347

ABSTRACT: Introduction: Climate variability and extreme weather events may impact climate-sensitive infectious diseases, one example being leptospirosis. This study provided an updated descriptive and exploratory analysis of leptospirosis in Brazil, focusing not only on temporal and regional patterns, but also on the 2024 floods in Rio Grande do Sul, providing insights into the potential health impacts of climate-related events. Methods: Nationwide surveillance data on reported leptospirosis cases, deaths, and case-fatality rates were analyzed across Brazil's five geographic regions from 2014 to 2025, together with mean annual regional precipitation data. Exploratory correlation analyses were conducted using data from 2014 to 2024. While data from 2025 were included descriptively, the epidemiological dataset was incomplete, rendering corresponding precipitation data unavailable, and these data were excluded from correlation analyses. Additional analyses examined the epidemiology of leptospirosis during the 2024 floods in Rio Grande do Sul. Results: Between 2014 and 2024, Brazil reported 36,261 leptospirosis cases and 3170 deaths. Nationwide, cases increased from 3428 in 2023 to 4142 in 2024, and deaths from 290 to 362. The South Region showed the largest increase, from 1238 to 1988. During the 2024 floods in Rio Grande do Sul, 242 confirmed cases, 17 deaths, and 3270 suspected cases were reported. Even though exploratory analyses identified positive correlations between annual precipitation and leptospirosis cases and deaths in the South and nationwide, their associations were heterogeneous. Conclusions: As they illustrate the complexity of assessing climate-related health effects in cases of leptospirosis, these findings should not be interpreted as evidence of causality. Integrated epidemiological, climatic, environmental, and socioeconomic surveillance is essential to the development of climate-informed preparedness and of timely responses to climate-sensitive infectious diseases.

LANGUAGE OF ORIGINAL DOCUMENT: English

Pedrosa J., Motta D., Gregg W., Rodrigues A., Lilenbaum W.

Diagnosis of bovine genital leptospirosis in asymptomatic bulls: comparison of methods and samples under field conditions

(2026) *Veterinary Record* 2026: e1–e3

DOI: 10.1002/vetr.71220

ABSTRACT: Background: Bovine leptospirosis is a zoonosis of global importance that is associated with reproductive losses. Although diagnosis in females has advanced, genital infection in males remains poorly understood. This cross-sectional study aimed to compare diagnostic methods and sample types for detecting bovine genital leptospirosis (BGL) in bulls under field conditions. Methods: Blood, urine, semen and preputial cytology samples were collected from 37 unvaccinated bulls and analysed by serology (microscopic agglutination test -MAT) and lipL32-PCR. Results: Serology showed low seroreactivity (13.5%), whereas PCR detected infection in 80.5% of bulls. *Leptospira* DNA was identified in semen (70.6%), preputial cytology samples (50%) and urine (46.8%). PCR detected a higher proportion of positive animals than MAT ($p < 0.05$). The genital tract had a higher frequency of *Leptospira* detection than the urinary tract ($p < 0.05$), with no significant difference between semen and preputial cytology samples ($p > 0.05$). Limitations: The sample size was small, and the number of samples collected differed among sample types. Conclusions: PCR using genital samples—semen and/or preputial cytology—is the method of choice for diagnosing BGL in asymptomatic bulls.

LANGUAGE OF ORIGINAL DOCUMENT: English

Castro Abreu I., Magalhães Almeida D., Ibelli Cabral B.C., Silva Castro L., Vaz Candelori B., Lessa Barbosa A.R., Mueller Aroeira D., de Barros Bandarra M.

Serological detection of *Leptospira interrogans* serovar Wolffi and clinical management of a crab-eating raccoon (*Procyon cancrivorus*) from the Brazilian Cerrado

(2026) Revista Brasileira de Medicina Veterinaria, 48, art. no. e002526

DOI: 10.29374/2527-2179.bjvm002526

ABSTRACT: The crab-eating raccoon (*Procyon cancrivorus*) is a widely distributed South American mesocarnivore that frequently inhabits human-modified landscapes, where it may play a role in the transmission of zoonotic pathogens. Leptospirosis is an important but underreported disease in free-ranging wildlife, particularly in South America. This report describes the clinical management of a free-ranging crab-eating raccoon rescued after a road accident in southeastern Brazil, presenting systemic, hepatic, renal, and neurological alterations. Given the epidemiological context and compatible clinical findings, serological testing for *Leptospira* spp. was performed using the microscopic agglutination test, which revealed a titer of 1:200 for serovar Wolffi. Although the titer was relatively low, it was interpreted as clinically relevant when integrated with laboratory abnormalities and clinical signs, supporting initiation of antimicrobial therapy. The animal received doxycycline and comprehensive supportive care, including analgesia, hepatoprotective treatment, nutritional support via esophageal tube, and management of neurological signs. Progressive clinical and laboratory improvement was observed, allowing tube removal after 10 days and transfer to rehabilitation. No recurrence of clinical signs was noted during a 60-day follow-up. This case highlights the importance of integrating serology, clinical evaluation, and epidemiology for the diagnosis of leptospirosis in wildlife and underscores the relevance of *P. cancrivorus* to One Health surveillance.

LANGUAGE OF ORIGINAL DOCUMENT: English

Kumar R., Laxman

Neural network analysis of the transmission dynamics of leptospirosis infection subjected to vaccination and treatment interventions

(2026) Journal of Microbiological Methods, 250, art. no. 107695

DOI: 10.1016/j.mimet.2026.107695

ABSTRACT: The rapid spread of infectious diseases can lead to substantial casualties worldwide, with the greatest impact on economically disadvantaged and resource-deficient nations. The widespread transmission of infection disrupts social life and economic activities, amplifying their impact beyond the public health system. In this paper, we analyze the dynamics of leptospirosis disease considering treatment for humans and vaccination for the animal population along with environmental bacteria control. We analyzed the qualitative behavior of the model, focusing on the positivity and boundedness of the system. The existence and stability conditions of the equilibrium points are analyzed in relation to the basic reproduction number. Real-world leptospirosis case records from Kerala (June 2018 to December 2024) are used to calibrate and evaluate the model's performance. The global sensitivity analysis of R_0 is employed to evaluate and illustrate the model parameters. The primary methodological contribution lies in the development of a hybrid deep neural network (DNN) framework that integrates Tanh and ReLU activation functions to accurately capture the complex dynamics of the model. A two-layer DNN is trained using the Levenberg-Marquardt algorithm with a 70%–15%–15% data split. The proposed DNN demonstrates remarkable predictive accuracy, achieving a mean squared error of 10^{-6} and an absolute error of 10^{-9} . This work introduced a novel framework combining dynamical system theory and deep learning for accurate and computationally efficient analysis of epidemic dynamics.

LANGUAGE OF ORIGINAL DOCUMENT: English

Sabri N.A., Shariff F.M., Jusoh S.A., Rodzli N.A.

Structural insights into the alphafold2-generated model of leptospiral lipoprotein signal peptidase (LspLep) using molecular dynamics simulations

(2025) Malaysian Journal of Biochemistry and Molecular Biology, 28 (3), pp. 29 - 41

ABSTRACT: Leptospirosis, primarily caused by *Leptospira interrogans*, is a neglected zoonotic disease endemic to tropical regions. As the third deadliest infectious disease after malaria and dengue, leptospirosis highlights the pressing need for novel therapeutic strategies, as existing broad-spectrum antibiotic regimens are frequently ineffective in severe cases. This study focused on leptospiral lipoprotein signal peptidase (LspLep), a critical enzyme involved in the maturation of lipoproteins essential for bacterial survival, presenting it as a potential therapeutic target. Due to the limitations of experimental structure determination, computational approaches were implemented to elucidate the structure and dynamic properties of LspLep. The AlphaFold2-predicted structure of LspLep exhibited strong homology to its orthologs LspPae (*Pseudomonas aeruginosa*) and LspMrs (*Staphylococcus aureus*), while distinctively featuring an additional periplasmic loop (PL2). Molecular dynamics (MD) simulations conducted for 500 ns demonstrated significant structural stability of LspLep in a lipid bilayer. Further analyses revealed the correlation between the dynamics in the unique PL2 and that of β -cradle. In addition, the simulation trajectories revealed the conformational transitions of LspLep from open to intermediate and closed states, alongside the persistent occupancy of a lipid molecule in the active site. In conclusion, these findings offer detailed structural and dynamic profiles of LspLep, guiding the development of structure-based therapeutic drugs against leptospirosis.

LANGUAGE OF ORIGINAL DOCUMENT: English

Roh T., Song K.

Non-oliguric IRIS grade V acute kidney injury associated with suspected leptospirosis in an urban dog unvaccinated against leptospirosis from the Republic of Korea: a case report

(2026) Veterinary Sciences, 13 (9), art. no. 982

DOI: 10.3390/vetsci13090982

ABSTRACT: Leptospirosis is a zoonotic disease that can cause severe acute kidney injury (AKI) in dogs. A three-year-old intact male Border Collie, unvaccinated against leptospirosis, with a history of exposure to urban stagnant water presented with acute vomiting, diarrhea, and moderate dehydration. Initial evaluation revealed extreme azotemia (blood urea nitrogen, 175.8 mg/dL; creatinine, 11.10 mg/dL) and hyperphosphatemia (13.6 mg/dL), consistent with International Renal Interest Society (IRIS) AKI Grade V; urine output remained within the non-oliguric range (2.15–3.0 mL/kg/h) throughout the catheterized period (Day 0–4). Clinical and imaging findings supported acute intrinsic renal injury over chronic kidney disease. A multiplex real-time PCR targeting the *Leptospira* LipL32 gene was positive in urine (Ct 31.10), providing molecular evidence supporting active infection or shedding of pathogenic *Leptospira* spp., without identifying the infecting serovar. Empirical antimicrobial therapy targeting suspected leptospirosis, together with intravenous fluid therapy, was initiated on clinical suspicion prior to the PCR result. Renal and inflammatory biomarkers improved progressively over 22 days without extracorporeal kidney support; the patient's non-oliguric status, hemodynamic stability, and objective clinical improvement supported this management approach. This report documents, in detail, the clinicopathological recovery trajectory of a dog with non-oliguric IRIS Grade V AKI associated with suspected leptospirosis, information that may assist clinicians in recognizing and managing similarly severe presentations without assuming that dialysis is always required.

LANGUAGE OF ORIGINAL DOCUMENT: English

Pooja P., Vishwakarma A., Singh V.B., Sella R.N., Venkatasubbu G.D., Ramya M.

A label-free graphene quantum dot-based fluorescent aptasensor for rapid and sensitive detection of *Leptospira interrogans*

(2026) Journal of Fluorescence

DOI: 10.1007/s10895-026-04936-9

ABSTRACT: Leptospirosis is a neglected tropical disease that is widespread in tropical and subtropical regions. The lack of rapid and sensitive diagnostic tools continues to limit the early identification of the disease. In this study, a graphene quantum dots-based aptasensor was developed for the detection of *Leptospira interrogans*. Graphene quantum dots were synthesized and used as fluorescence transducers, which are covalently conjugated with cell surface-specific DNA aptamer targeting the pathogen. The synthesized quantum dots exhibited quasi-spherical morphology with particle size ranging from ~ 2.5 nm. Upon target recognition, the GQD-aptamer conjugate exhibited concentration-dependent fluorescence quenching, showing a linear response over the range of 10^3 - 10^8 CFU/mL ($R^2 = 0.958$) and a limit of detection of 10^3 CFU mL⁻¹. The assay was completed within 15 min. The sensing platform was further evaluated under biologically relevant conditions, including protein-containing buffer, heat-treated cells, diluted serum, and artificial urine samples. In addition to spectroscopic analysis, dark-field microscopy revealed pronounced aggregation and clustering of *Leptospira* cells following treatment with the GQD-aptamer conjugate. The combined spectroscopic and microscopic findings support the proposed sensing mechanism and highlight the potential of the developed

GQD-aptamer platform as a rapid fluorescence-based aptasensor for *Leptospira*, with future applicability towards point-of-care diagnostic development.

LANGUAGE OF ORIGINAL DOCUMENT: English

Durang Laine R., Servillon Rvin J.T., Francisco-Breva A.F., Buelis G.C.L., Martin M.A.B., Hinay A.A., Jr.

Temporal trends and factors associated with human leptospirosis in Davao City, Philippines: an 11-year surveillance analysis (2015–2025)

(2026) *Acta Microbiologica Hellenica* (Switzerland), 71 (3), art. no. 23

DOI: 10.3390/amh71030023

ABSTRACT: Leptospirosis remains a significant public health concern in the Philippines, particularly in urban tropical settings where environmental and climatic conditions favor disease transmission. This study examined temporal trends and factors associated with human leptospirosis in Davao City, Philippines, using surveillance data from 2015 to 2025. A retrospective observational study was conducted using 1104 surveillance records obtained from the Davao City Health Office–City Epidemiological Surveillance Unit. Annual incidence and mortality rates were calculated per 100,000 population; temporal trends were assessed using Mann–Kendall tests; and associations with demographic, seasonal, geographic, and environmental factors were evaluated using Poisson and negative binomial regression models, as appropriate, based on model diagnostics and comparative fit. Increasing incidence trends were observed across several strata, whereas increasing mortality trends were identified in selected demographic and environmental categories. In the incidence analysis, a higher disease burden was associated with age ≥ 15 years (aIRR = 14.75, 95% CI: 10.77–20.21), male sex (aIRR = 4.78, 95% CI: 3.74–6.11), high population density (aIRR = 4.19, 95% CI: 2.75–6.38), and the wet season (aIRR = 1.30, 95% CI: 1.04–1.61). Mortality was also strongly associated with age ≥ 15 years (aIRR = 36.75, 95% CI: 13.61–99.22) and male (aIRR = 8.50, 95% CI: 4.73–15.27). These findings provide a long-term surveillance-based assessment of leptospirosis in Davao City and identify demographic and environmental patterns relevant to targeted surveillance, seasonal preparedness, and locally adapted prevention strategies for leptospirosis.

LANGUAGE OF ORIGINAL DOCUMENT: English

Stratton H., Pownell C., Sandeman M., Rosengren P., Price C., Stewart A.G.A., Gavey R., Kinneally T., Petoumenos K., Smith S., Hanson J.

Deciphering the “Doxycycline Deficiency Syndrome”: defining the characteristic clinical, laboratory and imaging findings in patients presenting with leptospirosis, Q fever and rickettsial diseases in Far North Queensland, Tropical Australia

(2026) *Tropical Medicine and Infectious Disease*, 11 (9), art. no. 237

DOI: 10.3390/tropicalmed11090237

ABSTRACT: Background: The “doxycycline deficiency syndrome” is a colloquial term used in tropical Australia to describe the overlapping, non-specific findings seen in leptospirosis, Q fever, and the rickettsial diseases scrub typhus and Queensland tick typhus (QTT). A laboratory confirmed diagnosis is frequently delayed, however, early differentiation of these potentially life-threatening infections has important implications for clinical management. Methods: We examined consecutive laboratory-confirmed cases of leptospirosis, Q fever, and rickettsial diseases managed at a referral centre in tropical Australia. The patients' symptoms, clinical signs and simple laboratory and radiology investigations at presentation were compared. Results:

There were 111 cases of leptospirosis, 59 cases of Q fever, and 34 cases of rickettsial disease (17 cases of QTT and 17 of scrub typhus). Patients with leptospirosis had a shorter duration of symptoms and were more likely to have gastrointestinal symptoms, arthralgia, haemoptysis, hypotension, conjunctival suffusion and abnormal chest auscultation at presentation than patients with the other infections. They were more likely to have renal impairment and an elevated creatine kinase but less likely to have an elevated serum ferritin and serum lactate dehydrogenase. Patients with leptospirosis were more likely to have alveolar and multilobar changes on chest imaging. Patients with Q fever were more likely to have abnormal liver function tests at presentation but were more likely to have preserved renal function and normal chest imaging. Patients with rickettsial disease were more likely to have a rash, an eschar, lymphadenopathy and splenomegaly. Overall, 76/204 (37%) required ICU admission, of whom 56 (74%) had leptospirosis, but all 204 patients survived to hospital discharge. Conclusions: Leptospirosis, Q fever, and rickettsial diseases can have a similar presentation, but simple clinical, laboratory and imaging findings can help distinguish these infections and expedite their optimal management.

LANGUAGE OF ORIGINAL DOCUMENT: English

Jagdhane R., Cattin R.

Clinical leptospirosis in a cat presenting with severe hypokalaemia and glucosuria

(2026) Journal of Feline Medicine and Surgery Open Reports, 12 (2)

DOI: 10.1177/20551169261476284

ABSTRACT: Case summary: A 1.5-year-old, female spayed domestic mediumhair cat presented for lethargy, inappetence, weight loss, polyuria, polydipsia and severe generalised muscle weakness with cervical ventroflexion. She was noted to be severely hypokalaemic and to have severe glucosuria without significant hyperglycaemia. PCR and serological tests suggested a diagnosis of leptospirosis serovar Pomona. The cat was treated with doxycycline, potassium supplementation and spironolactone, after which the hypokalaemia improved and glucosuria resolved when assessed 2 weeks later. Relevance and novel information: Cats are generally considered to be resistant to clinical infection with leptospirosis, and reports of clinical disease are rare. To the authors' knowledge, there have been no reports of hypokalaemia or severe glucosuria in clinically affected cats. In addition, this report highlights the importance of considering leptospirosis as a differential diagnosis in cats who are exposed to various risk factors reported for this disease.

LANGUAGE OF ORIGINAL DOCUMENT: English

Ganguly S., Dolker S., Dasgupta S., Kundu S., Wangmo L.K., Sarkar A., Sharma L.K., Thakur M.

One Health Surveillance reveals cryptic multi-host circulation of *Leptospira interrogans* in Darjeeling Himalayas

(2026) Journal of Pure and Applied Microbiology, 20 (3), art. no. 11804, pp. 2325 - 2332

DOI: 10.22207/JPAM.20.3.26

ABSTRACT: Leptospirosis is a globally important zoonotic disease caused by pathogenic *Leptospira* species, affecting humans and a broad range of domestic and wild animals. Despite its public health relevance, molecular evidence from the Himalayan region of India remains limited, particularly across multiple host groups within shared ecological settings. The present study aimed to investigate the occurrence and genetic identity of pathogenic *Leptospira* in humans and animals from the Darjeeling landscape of the Eastern Himalayas. A total of 294 samples, comprising human and domestic/peri-domestic animal specimens, were screened by

LipL32-specific PCR for the detection of *Leptospira*. Overall, 15 samples (5.10%) tested positive, including 9 humans, 5 dogs, and 1 rodent, indicating circulation of the pathogen across multiple host species in the study area. Sequence similarity analysis of the representative amplicons showed 100% identity with *Leptospira interrogans*, and phylogenetic analysis further demonstrated that all study-derived sequences clustered within the pathogenic *L. interrogans* clade, with no clear host-specific segregation. The close clustering of sequences from humans, dogs, and rodent-associated samples suggests a shared transmission ecology or overlapping exposure network within this ecologically complex landscape. To our knowledge, this is among the first molecular evidence from Darjeeling demonstrating the occurrence of pathogenic *L. interrogans* across multiple host groups. These findings provide baseline molecular evidence of pathogenic *L. interrogans* in Darjeeling and support the need for broader One Health surveillance incorporating human, animal, rodent, and environmental sampling in the Eastern Himalayan region.

LANGUAGE OF ORIGINAL DOCUMENT: English

Chittrakarn S., Surasombatpattana S.

A review of the leptospirosis diagnostic modalities: from bench to bedside

(2026) Journal of Health Science and Medical Research, 44 (6), art. no. e20261428

DOI: 10.31584/jhsmr.20261428

ABSTRACT: Leptospirosis is a major cause of acute febrile illness in tropical regions, particularly in flood-prone settings. Accurate diagnosis remains challenging, especially during the early phase of infection, because of the nonspecific clinical manifestations and stage-dependent limitations of the available diagnostic tests. Consequently, delayed recognition and treatment continue to contribute to adverse outcomes. This review aims to summarize and critically appraise the current diagnostic modalities for leptospirosis, encompassing both clinical prediction scores (the THAI-LEPTO and OPD Lepto scores) and laboratory techniques (microscopy, culture, molecular assays, and serology), emphasizing the integration of clinical assessment with laboratory testing across different stages of the disease. The diagnostic implications of the biphasic course are highlighted, underscoring the importance of aligning test selection with illness timing. Clinical diagnosis and structured scoring systems are reviewed as tools to support presumptive diagnosis when confirmatory testing is unavailable or inconclusive. Conventional laboratory methods, including dark-field microscopy, culture, and serological assays, are discussed alongside molecular techniques such as polymerase chain reaction-based testing. By clarifying the strengths and limitations of each modality, this review aims to assist clinicians in selecting appropriate tests, interpreting results within clinical contexts, and initiating timely therapy.

LANGUAGE OF ORIGINAL DOCUMENT: English

Dias Pereira Soares E., de Oliveira Rodrigues N., Maia Andrade Colares M., Carreno Villarreal N.L., Bohn Oliveira T.L., Dellagostin O.A.

Sensors and biosensors for leptospirosis diagnostics: a scientific and technological review

(2026) Sensing and Bio-Sensing Research, 54, art. no. 101087

DOI: 10.1016/j.sbsr.2026.101087

ABSTRACT: Leptospirosis causes more than one million human cases annually, yet effective, accessible, and field-deployable diagnostic tools are still limited. Biosensors have emerged as promising alternatives or complementary tools to conventional methods. This review summarizes the current scientific and technological landscape of sensors and biosensors developed for leptospirosis diagnosis or pathogenic *Leptospira*

detection. The search strategy, conducted in March 2026, included PubMed, Web of Science, Scopus, Espacenet, WIPO, and INPI, and aimed to identify scientific articles and patent documents related to sensors, biosensors, rapid tests, and point-of-care technologies for *Leptospira* spp. detection. Eligible documents written in English or Portuguese were independently screened by pairs of reviewers, with disagreements resolved by a third reviewer. The 47 selected studies and 7 patent documents described a broad range of technologies, differing in transducer, bioreceptor, analyte, detection format, and validation. Electrochemical and optical biosensors were the most frequently reported approaches, often showing low limits of detection and potential for miniaturization and portability. Paper-based platforms and molecularly integrated devices were also identified, offering advantages for point-of-care use and sensitivity enhancement. However, most technologies remain at an early stage of development, with limited validation using clinical, animal, or environmental samples. Methodological heterogeneity, incomplete reporting of performance parameters, and the lack of harmonized comparisons between direct and indirect detection strategies hamper objective assessment of diagnostic utility. Overall, available sensor-based technologies show substantial promise for leptospirosis diagnostics, but further validation, standardization, usability assessment, and investment are required to advance these platforms toward higher technology readiness and real-world implementation.

LANGUAGE OF ORIGINAL DOCUMENT: English

Xu G., Li Y., Liu W., Han T., Zeng Z., Huang L., He F., Nian Y., Hu S., Lin F., Wu S., Xiao F.

Epidemiological characteristics of leptospirosis and serological surveillance among reservoir animals and healthy populations in Fujian, China, 2004-2024

(2026) *Frontiers in public health*, 14, pp. 1891639

DOI: 10.3389/fpubh.2026.1891639

ABSTRACT: Background: Leptospirosis is a globally distributed zoonosis caused by pathogenic *Leptospira*. This study investigated the epidemiological characteristics of leptospirosis in Fujian Province, China, from 2004 to 2024 to provide evidence for risk assessment and prevention strategies. Methods: Data on human leptospirosis cases, reservoir animals, and healthy populations in Fujian Province from 2004 to 2024 were collected through the Infectious Disease Surveillance System of the Chinese Center for Disease Control and Prevention and 31 surveillance sites. Descriptive epidemiological methods were used to analyze temporal, spatial, and population distribution characteristics. Joinpoint regression, spatial autocorrelation, and spatiotemporal scan analyses were performed to identify temporal trends and spatiotemporal clustering. Serological data from rodents and healthy populations were analyzed to assess antibody prevalence and serogroup distribution. Results: From 2004 to 2024, the incidence of leptospirosis in Fujian Province showed a significant downward trend, with an average annual incidence of 0.08 cases per 100,000 population. A total of 681 cases were reported, mainly between July and October and concentrated in northern and north-central Fujian. Farmers and individuals aged 30-69 years constituted the major affected populations, and the age at onset gradually increased over time. Significant spatial clustering was observed (Moran's $I > 0$, $p < 0.05$), with Songxi County identified as a hotspot and southern Fujian as a coldspot. Spatiotemporal analysis further identified Wuping County as the primary spatiotemporal cluster during June 2005 to August 2014. From 2005 to 2024, the average rodent capture rate at surveillance sites was 6.75%, predominantly involving *Rattus losea* and *Rattus tanezumi*. The average seroprevalence of *Leptospira* antibodies was 32.89% in rodents and 17.81% in healthy individuals. Javanica, Autumnalis, and Pomona predominated in rodents, whereas Autumnalis, Grippotyphosa, and Australis predominated in healthy individuals. Conclusion: Leptospirosis

incidence in Fujian Province declined substantially from 2004 to 2024 but remained characterized by marked spatial clustering and seasonal patterns. Rodents remained important reservoir hosts of *Leptospira*, while serogroup distributions differed between reservoir hosts and humans, indicating complex transmission dynamics. Long-term surveillance provides valuable information for understanding the epidemiology of leptospirosis and supporting prevention and control efforts.

LANGUAGE OF ORIGINAL DOCUMENT: English

Ganesan G., Venkataramanan N.S., Suvitha A.

In silico and phytochemical investigation of *Strychnos nux-vomica* leaf extract against LipL32 protein of *Leptospira* spp

(2026) Journal of Physics: Conference Series, 3246 (1), art. no. 012052

DOI: 10.1088/1742-6596/3246/1/012052

ABSTRACT: Leptospirosis remains a significant zoonotic disease caused by pathogenic *Leptospira* spp. The outer membrane lipoprotein LipL32 plays a critical role in virulence and host interaction, making it a promising molecular target. In this study, *Strychnos nux-vomica* leaf extract was subjected to qualitative phytochemical screening and UV–Visible spectroscopic analysis, followed by molecular docking and ADMET prediction of selected alkaloids against LipL32. Four major alkaloids—strychnine, brucine, colubrine, and vomicine—were evaluated. Vomicine exhibited the most favorable binding energy (–8.023 kcal/mol). ADMET analysis suggested acceptable gastrointestinal absorption while highlighting potential toxicity concerns for certain alkaloids. These findings provide preliminary computational insights into LipL32 inhibition and require further experimental validation.

LANGUAGE OF ORIGINAL DOCUMENT: English

Cavalcante A.L.M.S.C., Bastos de Lima G., da Silva de Oliveira L.J., Souto Moura S., Mouzinho de Paula da
Associations between hydrological extremes, delayed precipitation, and leptospirosis dynamics in the Brazilian Amazon

(2026) Zoonotic Diseases, 6 (3), art. no. 27

DOI: 10.3390/zoonoticdis6030027

ABSTRACT: Leptospirosis is a climate-sensitive zoonosis whose transmission is associated with environmental and hydrological conditions, particularly in tropical regions. This ecological time-series study investigated the associations between leptospirosis incidence and climatic, hydrological, and structural variables in the Brazilian Amazon from 2005 to 2024 using annually aggregated data. Annual confirmed cases were obtained from national surveillance systems, while climatic and extreme-event data were derived from official meteorological and disaster databases. Associations were evaluated using generalized additive models with a negative binomial distribution. Leptospirosis incidence exhibited marked interannual variability without a significant temporal trend. Flooding events were significantly associated with increased incidence, whereas mean temperature and accumulated precipitation showed no independent association. Lagged precipitation emerged as a significant predictor, suggesting that environmental conditions associated with transmission may persist beyond the initial exposure period. Heavy rainfall events increased over time but were not associated with incidence. Sanitation coverage improved consistently but did not explain temporal variation in disease occurrence. These findings suggest that hydrological extremes and delayed precipitation patterns may serve

as useful indicators of leptospirosis dynamics in the Brazilian Amazon. Incorporating these indicators into surveillance systems may improve the characterization of leptospirosis patterns in tropical regions.

LANGUAGE OF ORIGINAL DOCUMENT: English

Chávez-Ramírez B.J., Ruíz-Ramírez J.A., García-Valle J.L., Macedo-Barragán R.J., Lizama-Munguía T., García-Márquez L.J., Topete-Bustamante D.A.

Serovars and risk factors associated with leptospiral seroprevalence in sheep flocks from Colima, Mexico

(2026) Revista Mexicana De Ciencias Pecuarias, 17 (3)

DOI: 10.22319/rmcp.v17i3.7028

ABSTRACT: Leptospirosis is a worldwide infectious zoonotic disease caused by pathogenic spirochetes of the genus *Leptospira*. Leptospirosis is frequently reported in sheep flocks in several countries and may contribute to the maintenance of infection; however, studies on leptospirosis in sheep in Mexico are scarce. Therefore, the objective of this study was to determine the seroprevalence of leptospirosis in sheep flocks from Colima, Mexico, to identify the predominant serovars and the principal associated risk factors. Serum samples from 487 sheep raised in 16 flocks were collected and screened using the microscopic agglutination test (MAT) to detect anti-*Leptospira* antibodies. The records regarding risk factors were analyzed by logistic regression model. The overall seroreactivity to at least one examined serovar was 46.82%, with 93.75% of the flocks showing at least one positive animal. Among the seroreactive sheep, antibody titers of 1:100 predominated (58.55%), while the highest titer was 1:1600 (1.32%). Bratislava was the predominant serovar (22.37%), followed by Ballum (16.45%), Hardjo (14.47%) and Copenhageni (13.82%), while 33.33% of sheep had antibodies to more than one serovar. Sheep deworming (OR= 15.39, 95% CI: 4.70-50.36), water stagnation (OR= 4.29, 95% CI: 1.83-10.07) and the geographic region of the production unit (OR = 1.99, 95% CI: 1.03-3.83) were associated with leptospiral seropositivity. It is concluded that seroreactivity to *Leptospira* spp. is widespread among sheep flocks of Colima, Mexico, with serovar Bratislava being the most frequently detected. The presence of stagnant water, particularly in production units located in the northern region of the state, was associated with leptospiral seropositivity.

LANGUAGE OF ORIGINAL DOCUMENT: English

Leyton N., Henríquez H., Salgado R., Herrera C., Chacón F., Neira V., Müller A., García-Peña G.E., Villaseñor N.R., Rojo G., Rubio A.V.

Eco-epidemiology of *Leptospira* infection in invasive rats across mediterranean landscapes of Central Chile

(2026) Zoonoses and Public Health

DOI: 10.1111/zph.70098

ABSTRACT: Introduction: Leptospirosis is a global zoonosis, and rodents are key maintenance hosts in many ecosystems. However, information on pathogenic *Leptospira* in Mediterranean-climate landscapes of Latin America remains limited. We evaluated its occurrence and associated ecological factors in invasive *Rattus norvegicus* and *Rattus rattus* across rural and natural habitats of central Chile. Methods: Kidney samples from 821 rats captured at 31 sites between 2023 and 2025 were screened by qPCR targeting *lipL32*. qPCR-positive samples were further analysed by conventional PCR targeting *rpoB*, and successful amplicons were sequenced for species identification. Associations with qPCR positivity were evaluated separately for each rat species using a multiscale framework incorporating individual traits, local habitat characteristics, landscape

composition and season. Results: Pathogenic *Leptospira* DNA was detected in 23 rats (2.8%) and was more frequent in *R. norvegicus* (8.4%) than in *R. rattus* (1.4%). All 11 successfully sequenced samples were assigned to *Leptospira interrogans*. In *R. norvegicus*, qPCR positivity was positively associated with river cover, and seasonal variation differed between sexes. In *R. rattus*, positivity was positively associated with body length and negatively associated with woody vegetation diversity and male sex. Candidate models containing local habitat type received substantially less support for both species, although positive rats occurred in rural and natural habitats. Conclusions: Pathogenic *Leptospira* occurs at low frequency in invasive rats across Mediterranean landscapes of central Chile, with associated individual and environmental factors differing between species. Species-informed surveillance incorporating environmental heterogeneity may better characterize *Leptospira* circulation than broad habitat classifications alone.

LANGUAGE OF ORIGINAL DOCUMENT: English

Mohammed F., Yakubu Y., Saidu B., Saulawa M.A., Garba B., Saulawa H.A.

Molecular survey of pathogenic *Leptospira* in reservoir household rats (*Rattus rattus*) and community risk perception in Sokoto Metropolis, Sokoto State, Nigeria

(2026) *Advances in Public Health*, 2026 (1), art. no. 9370401

DOI: 10.1155/adph/9370401

ABSTRACT: Introduction: Leptospirosis is an underrecognized zoonosis maintained by a coevolved host–pathogen relationship in which rodents serve as asymptomatic reservoir hosts, with household rats acting as important reservoirs for pathogenic *Leptospira*. Evidence on circulating pathogenic strains and community risk perception in Sokoto Metropolis, Nigeria, remains limited, warranting an integrated One Health investigation. This study aimed to detect pathogenic *Leptospira interrogans* in household rats in the Sokoto Metropolis and examine the associations between rat infection status, household demographic and environmental factors, and community awareness of leptospirosis. Methods: From 212 households across five local government areas (Dange-Shuni, Kware, Sokoto North/South, and Wamakko), 212 *Rattus rattus* were screened by enzyme-linked immunosorbent assay (ELISA), and positive results were confirmed by quantitative PCR (qPCR) using kidney samples targeting lipL32. Participants (n = 212) provided demographic information and completed knowledge/perception questionnaires. Bivariate and multivariable logistic regression analyses were used to identify the predictors of infection ($p < 0.05$). Results: ELISA detected 70/212 (33%) positive samples, and qPCR confirmed pathogenic *Leptospira* spp. in 33% (70/212), with complete concordance between ELISA and qPCR results. Households with 6–10 members showed significantly higher odds of PCR-positive rats than households with 1–5 members (COR = 3.12, 95% CI: 1.34–7.24, $p = 0.008$) an association that persisted after adjustment (adjusted odds ratio [AOR] = 3.37, 95% CI: 1.24–9.01, $p = 0.017$). Ownership of 6–10 livestock animals, relative to 1–5 animals, was similarly associated with higher odds of positivity in bivariate analysis (COR = 2.19, 95% CI: 1.10–4.37, $p = 0.026$), though this association did not remain significant after adjustment for other factors. The Kware district conferred the highest adjusted risk (AOR = 7.72, 95% CI: 1.33–14.87, $p = 0.023$). Respondents from households with PCR-positive rats were more likely to report that they did not know which diseases are associated with rodents. ($\chi^2 = 13.02$, $p = 0.043$), despite 98%–100% rodent sightings and 60%–68% threat recognition; leptospirosis awareness was low (7%–11%). Pathogenic *L. interrogans* circulates at high rates in Sokoto's household rats, driven by overcrowding, livestock proximity, and Kware's flood-prone ecology. Knowledge deficits amplify transmission despite the general awareness of rodents. Conclusion: Findings advocate targeted health intervention: rodent control in dense/livestock households,

focused trapping, and education emphasizing leptospirosis alongside Lassa fever. Enhanced surveillance can curb outbreaks in northern Nigeria.

LANGUAGE OF ORIGINAL DOCUMENT: English

Ward M.H., Scherer N., Shriver L.P., Patti G.J.

Glutamine from plasma-like medium fuels nitrogen metabolism and influences proliferation in *Leptospira interrogans*

(2026) PLoS pathogens, 22 (10), pp. e1014534

DOI: 10.1371/journal.ppat.1014534

ABSTRACT: Leptospirosis, caused by pathogenic *Leptospira* spp. such as *L. interrogans*, is a bacterial zoonosis of increasing prevalence with no consistently effective treatments in severe cases. We sought to characterize metabolic mechanisms that support *L. interrogans* infection, with the ultimate goal of revealing unexplored therapeutic opportunities. We first established and validated a culture medium, which we refer to as supplemented Human Plasma-Like Medium (sHPLM). sHPLM more closely resembles the physiological environment of the human host than standard culture media, such as the EMJH (Ellinghausen-McCullough-Johnson-Harris) medium typically used for *Leptospira* culture. We also pioneered metabolomics approaches to study sHPLM-cultured *Leptospira*. Specifically, we developed a liquid chromatography/mass spectrometry (LC/MS) workflow for both medium metabolomics and stable isotope tracing with *L. interrogans* cultures. The application of these technologies in *L. interrogans* revealed that the amino acid glutamine is a major nitrogen source among the many available in sHPLM. Subsequent growth studies in three pathogenic *Leptospira* strains and the nonpathogenic strain *L. biflexa* Patoc-1 showed robust proliferation when only glutamine-derived nitrogen was available. Further, a small-molecule inhibitor designed to target glutamine utilization, JHU-083, effectively impaired the proliferation of *L. interrogans* cultures. Adding glutamine to non-physiological EMJH medium also rapidly induced a short-term proliferative boost in *L. interrogans* and increased biofilm formation. RNA-sequencing after glutamine exposure revealed transcriptional trends for increases in biosynthesis to support these phenotypes. Although ammonium has long been thought to be the sole nitrogen source for *Leptospira* spp., our results demonstrate that glutamine provides a second source of nitrogen for biosynthesis in multiple strains and may act as a metabolite signal to alter *L. interrogans* physiology in ways that could influence infection. This work highlights that studying *L. interrogans* under physiological conditions is key to understanding mechanisms supporting infection and points to nitrogen assimilation as a potential target for therapies.

LANGUAGE OF ORIGINAL DOCUMENT: English

Merrin S.B., Ramya M.

Expression and functional characterisation of the zinc-dependent metalloprotease LIC11568 from *Leptospira interrogans* reveals collagenolytic activity

(2026) Molecular Biology Reports, 53 (1), art. no. 1685

ABSTRACT: Background: Metalloproteases are important virulence factors that facilitate bacterial dissemination through degradation of host extracellular matrix proteins. While proteolytic activities have been reported in pathogenic *Leptospira*, the biochemical characterisation of individual metalloproteases remains limited. Methods and Results: In this study, the putative M23 metalloprotease LIC11568 from *Leptospira interrogans* was characterised using bioinformatic analysis, recombinant protein production by cell-free protein

synthesis, affinity purification, matrix-assisted laser desorption/ionisation time-of-flight (MALDI-TOF) peptide mass fingerprinting, and functional enzymatic assays. Bioinformatic analysis supported the previously reported LysM and M23 metallopeptidase domain architecture of LIC11568 and additionally predicted an N-terminal signal peptide. Recombinant LIC11568 was successfully produced using cell-free protein synthesis after recombinant protein production was not detectable by SDS-PAGE in *Escherichia coli* under the conditions tested, and its identity was supported by MALDI-TOF peptide mass fingerprinting. Functional assays demonstrated that LIC11568 degraded Type I collagen in a time-dependent manner, with maximum activity observed after 5 h at pH 8.0 and 37 °C. Collagenolytic activity increased with enzyme concentration and was strongly inhibited by 1,10-phenanthroline. Activity was restored by Zn²⁺, whereas Ca²⁺ alone failed to recover activity, supporting the zinc dependence of LIC11568 under the tested conditions. Conclusion: This study provides the first biochemical characterisation of LIC11568 as a functional M23 collagenolytic metalloprotease from *L. interrogans*. Its ability to degrade Type I collagen in vitro identifies collagen as a substrate under the conditions tested and provides a basis for further investigation of its substrate specificity and potential role in extracellular matrix interactions during leptospiral infection.

LANGUAGE OF ORIGINAL DOCUMENT: English

Yerimova A.Y., Kirkimbayeva Z.S., Valdovska A., Biyashev B.K., Kuzembekova G.B., Oryntayev K.B., Bessembayeva L.B., Abdeliyev B.Z.

One Health assessment of *Leptospira* circulation in aquatic ecosystems, wild rodents, and livestock in Kazakhstan

(2026) Veterinary World, 19 (10), pp. 4446 - 4470

DOI: 10.14202/vetworld.2026.4446-4470

ABSTRACT: Background and Aim: Leptospirosis is an important zoonosis maintained through interactions among environmental reservoirs, wildlife, livestock, and humans. Despite ongoing veterinary surveillance, information on the environmental circulation of *Leptospira* spp. in Kazakhstan remains limited. This study aimed to investigate the circulation and diversity of *Leptospira* spp. in major aquatic ecosystems of Kazakhstan using metagenomic sequencing within a One Health framework, complemented by rodent surveillance and livestock serological data. Materials and Methods: Surface water samples were collected during June–August 2021–2024 from 13 epizootologically significant water bodies representing different climatic and hydrological zones of Kazakhstan. In total, 208 samples were examined using shotgun metagenomic sequencing to characterize the relative abundance and species composition of *Leptospira* spp. Rodent surveillance included serological testing and molecular examination, while livestock data comprised epidemiological records and serological monitoring of 8,617 animals from 17 regions. These complementary datasets were integrated to characterize environmental and animal-associated circulation of *Leptospira* spp. Results: *Leptospira* spp. represented 0.4%–0.7% of bacterial sequences in surface water, with a mean relative abundance of 0.55% ± 0.15%. Among identified species, *Leptospira interrogans* accounted for 1%–39%, averaging 14.0% ± 13.0%, whereas *Leptospira borgpetersenii* and *Leptospira kirschneri* occurred at substantially lower proportions. Wild rodent seroprevalence during 2020–2025 was 0.09% (230/255,773), reaching 0.34% in great gerbils (*Rhombomys opimus*) in selected regions. Among reported livestock cases, cattle accounted for 50%, horses for 30%, and sheep and pigs for 10% each. Serological monitoring demonstrated regional seroprevalence of 1.1%–11.4% in cattle and 1.1%–6.6% in sheep. Conclusion: The findings provide metagenomic and serological evidence of low-intensity *Leptospira* spp. circulation across aquatic ecosystems and animal

reservoirs in Kazakhstan and demonstrate the value of integrated One Health surveillance. However, the absence of culture isolation and targeted molecular confirmation of environmental detections precludes confirmation of viable pathogenic leptospires. Prospective longitudinal surveillance integrating environmental, animal, and human sampling, physicochemical water characterization, culture isolation, and molecular confirmation is warranted.

LANGUAGE OF ORIGINAL DOCUMENT: English

Museux K., Desvars-Larrive A., Bourhy P., Giraud-Gatineau A., Lorient C., Boucraut C., Picardeau M.

A multidimensional epidemiological study of 905 canine leptospirosis cases, metropolitan France, 2020–2024

(2026) Scientific Reports, 16 (1), art. no. 30934

DOI: 10.1038/s41598-026-63399-x

ABSTRACT: Despite availability of multivalent vaccines, leptospirosis remains a major concern in dogs, yet its epidemiology and associated risk factors are still poorly defined. Integrating molecular, serological, clinico-pathological, hemato-biochemical, spatio-temporal, and demographic data on 905 cases across metropolitan France, this study characterises the contemporary epidemiology of dog leptospirosis. From 2020 to 2024, 4,839 dogs with suspected infection were tested by qPCR, with genotyping of qPCR-positive (*lfb1* gene) samples, and microscopic agglutination tests (MAT) were performed on serum samples. Overall, 18.7% of suspected dogs were qPCR-positive (median age = 3 years). Annual incidence peaked in 2024 with an estimated 2.72 cases per 100,000 dog-years at risk. Spatio-temporal patterns showed strong seasonality (July–October) and southern hotspots. Seven species-group (SGs) were evidenced, dominated by *Leptospira interrogans* SG5 (47.3%), associated with serogroup Australis, and *L. interrogans* SG1 (45.6%, serogroup Icterohaemorrhagiae). Clinically, most cases presented with a core syndrome, though *L. interrogans* SG1 was strongly associated with icterus. Urine qPCR outperformed blood qPCR test, especially during the acute phase. Vaccination significantly reduced risk of icterus but not mortality. These findings confirm that leptospirosis persists in dogs despite vaccination and remains a clinical challenge, underscoring the need for prevention strategies tailored to circulating serogroups, particularly in young dogs.

LANGUAGE OF ORIGINAL DOCUMENT: English

Ponnidurai M., Pal A., Kirubakaran V.K., Krishnamurthy A., Venkatappa B., Yeluvaguli Prassanna A., Prashant Bokade P., Munagala S.V., Lakshmiopathy A., H.B. C.K., Mohandoss N., Vinayagamurthy B.

A simple modified method for long-term glycerol-based cryopreservation of *Leptospira* spp. in liquid nitrogen

(2026) Biopreservation and Biobanking

DOI: 10.1177/19475535261493709

ABSTRACT: Introduction: A simple and reliable method for long-term preservation of *Leptospira* spp. is essential for maintaining reference strains and field isolates for diagnostic and research purposes. Although 10% glycerol is commonly used as a cryoprotectant for *Leptospira* preservation, the isolates in this study showed poor recovery, highlighting the need to optimize glycerol levels for cryopreservation in liquid nitrogen. Objective: This study evaluated the storage of reference serovars *Leptospira interrogans* serovar Australis (pathogenic), *Leptospira fainei* serovar Hurstbridge (intermediate), and *Leptospira biflexa* serovar Patoc (nonpathogenic) with 10% and 15% glycerol and 28 additional reference serovars, and 11 field isolates using

15% glycerol in liquid nitrogen. Methods: Cultures were grown for 7 days in Ellinghausen–McCullough–Johnson–Harris (EMJH) media supplemented with 10% rabbit serum and cryopreserved with 10% and 15% glycerol using a controlled-rate freezing protocol before storage at -196°C . Viability was assessed monthly for up to 15 months using dark-field microscopy and Petroff–Hausser chamber counts. Results: Both reference serovars ($n = 31$) and field isolates ($n = 11$) were successfully preserved using 15% glycerol and repeatedly recovered. Paired t-test showed significant differences ($p < 0.01$) between 10% and 15% glycerol, while Kruskal–Wallis analysis confirmed consistent cryoprotective efficiency of 15% glycerol across different *Leptospira* species. Microscopic agglutination test confirmed unchanged antigenic properties, while hamster model studies demonstrated retained virulence, evidenced by acute leptospirosis. Conclusion: This optimized protocol supports reliable long-term cryopreservation of *Leptospira* spp. in liquid nitrogen without compromising viability, antigenicity, or virulence characteristics.

LANGUAGE OF ORIGINAL DOCUMENT: English

Cabaleiro-Raña N., Melián Rodríguez L., Sousa-Iglesias Á.

Letter to the Editor – Lower-limb arthromyalgias as an early clue to leptospirosis

(2026) Infectious Diseases in Clinical Practice, 34 (6), art. no. e1676

DOI: 10.1097/IPC.0000000000001676

LANGUAGE OF ORIGINAL DOCUMENT: English

Pinza Vera D.E., Chica Jácome S., Izquierdo-Condoy J.S., Vasconez-Gonzalez J., Ortiz-Prado E.

Clinical and epidemiological profile of hospitalized patients with leptospirosis: a cross-sectional study in Durán, Ecuador, 2023

(2026) Frontiers in Cellular and Infection Microbiology, 16, art. no. 1921311

DOI: 10.3389/fcimb.2026.1921311

ABSTRACT: Introduction – Leptospirosis is a globally distributed zoonosis, particularly prevalent in tropical and subtropical regions, with epidemic potential during the rainy season. It is caused by pathogenic *Leptospira* species and produces a wide clinical spectrum, ranging from mild febrile illness to severe, life-threatening disease. Objective – To describe the clinical and epidemiological characteristics of hospitalized patients with serologically supported leptospirosis in Durán, Guayas province, Ecuador. Methods – A descriptive, cross-sectional study was conducted at the Hospital General Dr. Enrique Ortega Moreira between January and June 2023. Patients aged 15 years or older with fever and positive IgM serology for leptospirosis were included. Data were obtained from anonymized medical records. Categorical variables were summarized as frequencies and percentages, and continuous variables as medians with interquartile ranges (IQR). Group comparisons used the Pearson chi-square or Fisher exact test for categorical variables and the Mann–Whitney U test for continuous variables. Results – Forty-eight patients met the inclusion criteria. Most were male (58.3%) and aged 15–39 years (85.5%). The most frequent symptoms were fever (93.8%) and diarrhea (83.3%). The median duration of fever was 17 days (IQR 8–21), reaching up to 60 days. Concurrent dengue IgM positivity was identified in 22.9% of patients and was associated with a longer median fever duration (19 vs 16 days; $p=0.036$). Frequent laboratory abnormalities included hypoalbuminemia (86.4%), hyponatremia (82.9%), hypokalemia (55.3%), thrombocytopenia (54.2%), and anemia (54.2%). The median hospital stay was 7 days (IQR 5–8). Conclusions – Hospitalized leptospirosis cases in Durán during the 2023 rainy season showed frequent gastrointestinal manifestations, laboratory abnormalities, prolonged fever, and substantial dengue

IgM positivity. These findings highlight diagnostic challenges in endemic coastal settings and support the need for strengthened surveillance, systematic evaluation of co-circulating infections, and national clinical practice guidelines for leptospirosis.

LANGUAGE OF ORIGINAL DOCUMENT: English

Bykovtseva D.A., Shcherbinin S.V., Galkina T.S., Gruzdev K.N.

Etiology and pathogenesis of leptospirosis: general patterns and features of manifestation in dogs (review)

(2026) Veterinary Science Today, 15 (3), pp. 241 - 251

DOI: 10.29326/2304-196X-2026-15-3-241-251

ABSTRACT: Introduction. Leptospirosis is an infectious disease hazardous to both humans and animals. Dogs serve as a key link in transmitting the infection to humans. Within the Russian Federation, the Canicola and Icterohaemorrhagiae serogroups are of primary relevance for dogs as the most virulent ones, although infection with other *Leptospira* spp. serogroups remains possible. The severity of the disease is determined by the pathogenicity factors of leptospires. Due to the zoonotic nature of leptospirosis, canine vaccination is a vital element of sanitary and epidemiological freedom. Regular immunization reduces the risk of human infection and prevents outbreaks. When selecting vaccines, the limited cross-protection between serogroups should be considered, with polyvalent products being preferred. However, existing vaccines do not provide reliable protection due to outdated serogroup compositions. The persistence of the causative agent within the animal host and its shedding into the environment diminish the effectiveness of prevention. A comprehensive approach is required to prevent canine infection and subsequent causative agent transmission to humans. Objective. To update and systemize data on canine leptospirosis caused by *Leptospira interrogans*. Materials and methods. Scientific publications by foreign and domestic authors available in bibliographic databases such as eLibrary, CyberLeninka, PubMed, Science Direct, Google Scholar, and others served as the material for this analytical study. Results. This analytical review presents up-to-date data on the epizootic and epidemiological situation regarding leptospirosis in the Russian Federation. It examines the properties of the causative agent, presents the classification of leptospires, and describes the clinical and post-mortem lesions of the disease. Furthermore, the review characterizes modern methods of laboratory diagnosis, treatment, and prevention of canine leptospirosis currently applied in veterinary practice, and outlines existing challenges. Conclusion. Leptospirosis is widespread in dogs. Leptospires are capable of adapting and persisting in the host organism, causing a chronic course of the disease, which poses a threat to human and animal health. The complexity of pathogenesis, the diversity of serotypes and intracellular persistence complicate the eradication of the causative agent. Current diagnostic and treatment methods require improvement. Research is needed to develop effective prevention and therapy protocols, including new approaches to specific prevention in dogs. Thus, leptospirosis remains a pressing issue in veterinary medicine requiring a comprehensive approach.

LANGUAGE OF ORIGINAL DOCUMENT: Russian

Kumar M., Kumar D., Singh S.K., Shukla A., Gangwar M., Vishwakarma R.K., Singh A.R., Rastogi S., Kumar A., Prakash P., Nath G.

Unravelling of leptospirosis in the humid subtropical climate of the eastern part of northern India

(2026) Journal of Global Infectious Diseases, 18 (3), pp. 105 - 111

DOI: 10.4103/jgid.jgid_244_25

ABSTRACT: Introduction: – Leptospirosis is a neglected zoonotic disease caused by *Leptospira* spirochetes and remains a significant public health concern in tropical and subtropical regions of India. The humid subtropical climate of Eastern Uttar Pradesh favors its transmission. Methods: – To assess the occurrence, demographic characteristics, seasonal trends, and epidemiological distribution of leptospirosis in Eastern Uttar Pradesh. A cross-sectional study was conducted on 2430 clinically suspected cases. Serum samples were tested for *Leptospira*-specific IgM antibodies using enzyme-linked immunosorbent assay (ELISA). Demographic details, occupational exposure, seasonal variation, and district-wise distribution were analyzed. Results: – Of 2430 suspected cases, 550 (22.6%) were IgM positive. Gender distribution was nearly equal (49.4% males; 50.5% females). The highest prevalence was observed in males aged 11–20 years and females aged 21–40 years, with overall higher positivity in the 11–30 years age group. Seasonal peaks occurred in October among males and November among females, correlating with monsoon and post-monsoon periods. Housewives, farmers, and students showed higher positivity rates, indicating domestic and agricultural risk factors. Cases were reported from 16 districts, with the highest positivity in Deoria (33.3%), Prayagraj (31.2%), and Azamgarh (23.6%). Increased seroprevalence was noted among residents living along the River Ganga in Varanasi. Conclusion: – Leptospirosis is endemic in Eastern Uttar Pradesh with significant seasonal and occupational associations. Enhanced surveillance, early diagnosis, and targeted preventive strategies are essential to reduce disease burden in this subtropical region.

LANGUAGE OF ORIGINAL DOCUMENT: English

Mittal N., Sahoo M.

A rare case of leptospirosis-induced fulminant myocarditis: a case report

(2026) *Annals of cardiac anaesthesia*, 29 (4), pp. 646 - 649

DOI: 10.4103/aca.aca_325_25

ABSTRACT: Leptospirosis is a rare but deadly disease that is often difficult to diagnose. Very often, it is a late presentation, and clinicians have limited time to save the patient's life. The authors hereby present a similar case in which extracorporeal membrane oxygenation played a crucial role.

LANGUAGE OF ORIGINAL DOCUMENT: English

Ghoraishizadeh P., Clemente B., Saimuang K., Lertjuthaporn S., limsampan S., Suwannin P., Techakasikornpanich M., Dounghawee G., Manahan E., Jangpatarapongsa K.

Novel target for pathogenic *Leptospira* detection via colorimetric loop-mediated isothermal amplification (LAMP): development, validation, and comparative analysis

(2026) *Journal of Clinical Laboratory Analysis*

DOI: 10.1002/jcla.70277

ABSTRACT: Background: Leptospirosis is a globally prevalent zoonotic disease that remains challenging to diagnose due to its nonspecific symptoms and the limitations of current diagnostic methods and targets. To address these challenges, we developed and validated a naked-eye loop-mediated isothermal amplification (LAMP) assay targeting the newly identified orpH region for the rapid detection of pathogenic *Leptospira* species. Methods: Comparative genomic analysis identified orpH as a conserved sequence among pathogenic *Leptospira*. A colorimetric LAMP assay (LAMP-orpH) was developed and evaluated using reference strains and serum samples obtained from patients with suspected leptospirosis. The diagnostic performance of the assay on these serum samples was evaluated in comparison with conventional PCR and the microscopic

agglutination test (MAT), with the real-time PCR assay targeting lipL32 designated as the reference standard. Results: The LAMP-orpH assay demonstrated 87.2% sensitivity and 94.8% specificity among 76 suspected cases and 29 controls, showing strong agreement with real-time PCR ($\kappa = 0.826$). It outperformed MAT (63.8% sensitivity) and conventional PCR (23.4% sensitivity), achieving a detection limit of 102 cells/mL in spiked serum. Conclusion: The LAMP-orpH assay offers a rapid, sensitive, and specific tool for early leptospirosis diagnosis. Its simple colorimetric readout and minimal equipment requirements make it ideal for use in rural and resource-limited settings, providing a practical alternative to MAT, conventional PCR, and qPCR.

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Editorial – The state of the globe: rediscovering leptospirosis beyond the coasts – lessons from the humid subtropics

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Impact of serum heat inactivation on the performance of the microscopic agglutination test in human leptospirosis diagnosis

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ABSTRACT: The clinical diagnosis of human leptospirosis is challenging owing to the non-specific nature of its symptoms, making laboratory confirmation essential. The microscopic agglutination test (MAT), recommended by the World Health Organisation as the reference serological method for diagnosing leptospirosis, requires ongoing efforts towards optimisation. The present study evaluated the impact of thermal inactivation of serum samples on MAT performance for the diagnosis of human leptospirosis. Thermal inactivation did not compromise antibody detection capacity. Discrepancies observed between inactivated and non-inactivated samples (8.4%; $n = 11/131$) were limited to minor titer variations and, in most cases, did not alter the study-defined case interpretation or the identification of the infecting serogroup. Furthermore, inactivation improved the clarity of agglutination reactions in some samples ($n = 5$).

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