# Diagnostic accuracy of genetic markers and nucleic acid techniques for the detection of Leptospira in clinical samples: a meta-analysis

## ABSTRACT

Background: Leptospirosis is often difficult to diagnose because of its nonspecific symptoms. The drawbacks of direct isolation and serological tests have led to the increased development of nucleic acid-based assays, which are more rapid and accurate. A meta-analysis was performed to evaluate the diagnostic accuracy of genetic markers for the detection of Leptospira in clinical samples. Methodology and principle findings: a literature search was performed in Scopus, PubMed, MEDLINE and non-indexed citations (via Ovid) by using suitable keyword combinations. Studies evaluating the performance of nucleic acid assays targeting leptospire genes in human or animal clinical samples against a reference test were included. Of the 1645 articles identified, 42 eligible studies involving 7414 samples were included in the analysis. The diagnostic performance of nucleic acid assays targeting the rrs, lipL32, secY and flaB genes was pooled and analyzed. Among the genetic markers analyzed, the secY gene showed the highest diagnostic accuracy measures, with a pooled sensitivity of 0.56 (95% CI: 0.50-0.63), a specificity of 0.98 (95% CI: 0.97-0.98), a diagnostic odds ratio of 46.16 (95% CI: 6.20-343.49), and an area under the curve of summary receiver operating characteristics curves of 0.94. Nevertheless, a high degree of heterogeneity was observed in this meta-analysis. Therefore, the present findings here should be interpreted with caution. Conclusion: The diagnostic accuracies of the studies examined for each genetic marker showed a significant heterogeneity. The secY gene exhibited higher diagnostic accuracy measures compared with other genetic markers, such as lipL32, flaB, and rrs, but the difference was not significant. Thus, these genetic markers had no significant difference in diagnostic accuracy for leptospirosis. Further research into these genetic markers is warranted.