Clinical implication of regional *Leishmania* species distribution in Ecuador: a cross-sectional study.

Jacob Bezemer[1,2], Byron Freire[3],Henry de Vries[2], Manuel Calvopiña[3] & Henk Schallig[2]

[1] Fundación Misión Cristiana de Salud, Hospital Shell, Shell, Ecuador; [2]Amsterdam University Medical Centers, Academic Medical Centre at the University of Amsterdam, Department of Medical Microbiology and Infection Prevention, Laboratory for Experimental Parasitology, Amsterdam Institute for infection and Immunity (AII), Amsterdam, Netherlands; [3] Universidad de las Américas, Facultad de Ciencias de la Salud, Carrera de Medicina, OneHealth Research Group, Quito, Ecuador

Among eight cutaneous leishmaniasis causing *Leishmania* species in Ecuador, *L.guyanensis* and *L.braziliensis* are dominant. Earlier studies on CL species in Ecuador focused on the Pacific areas, included only few patients from the Amazon region, and did not study patient characteristics. The resulting lack of knowledge impairs a region specific diagnosis and therapy for CL possibly leading to treatment delay and patient suffering. Patients were included from January 2019 through June 2021 by private and public primary health care centers and hospitals in the Pacific part of the Pichincha province and in the Amazonian Napo, Pastaza, and Morona Santiago provinces. All patients were subjected to a microscopic smear slide examination of a skin lesion suspected for CL in the participating centers. Patients without *Leishmania* parasite confirmation were excluded. A skin scraping and filter paper imprint sample was taken from the border of the lesion for smear slide microscopy and qPCR. *Leishmania* species was determined by Cytochrome B sequencing in all qPCR positive patients. Additional patient and geographic variables were collected per patient. All calculations were done in SPSS Statistics version 28, considering P <0,05 as statistically significant. Presence of *Leishmania* parasites was confirmed with PCR and/or microscopy in 245 patients who were included for this study. 154 patients (63%) were infected in the subtropical Pacific region and 91 (37%) in the Amazon.

Infecting *Leishmania* species could be determined in 135 (73%) patients. *L.guyanensis* was the main CL causing species (93%) in the subtropical Pacific, but more than half of the patients with species determination from the Amazon was either infected by *L.braziliensis* (46%) or *L.lainsoni* (13%). Patients infected in the Pacific region had significantly (P = 0,01) higher concentrations of *Leishmania* DNA in the samples. Median health seeking delay for patients infected in the Amazon was 1 month longer (P <0,01). Lesion type and number of lesions was not significantly different across regions. *L.guyanensis* was the dominant species in CL patients in the Pacific region and health seeking delay was relatively short leading to a low risk of mucosal leishmaniasis (ML). The majority of CL lesions in the Amazon was caused by *L.braziliensis* (causative agent of ML) or *L.lainsoni*, health seeking delay was longer. We recommend future studies of determinants of health seeking delay in CL patients and regional analysis of diagnostic accuracy in Ecuador and neighbor countries Peru and Colombia.