

## Unusual localization of blood-borne *Loa loa* microfilariae in the skin depends on microfilarial density in the blood: Implications for onchocerciasis diagnosis in co-endemic areas

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### Background:

The diagnostic gold standard for onchocerciasis relies on identification and enumeration of (skin-dwelling) *Onchocerca volvulus* microfilariae (mf) using the skin snip technique (SST). In a recent study, blood-borne *Loa loa* mf were found by SST in individuals heavily infected with *L. loa*, and microscopically misidentified as *O. volvulus* due to their superficially similar morphology. This study investigates the relationship between *L. loa* microfilarial density (*Loa* MFD) and the probability of testing SST positive.

### Methods:

A total of 1,053 participants from the (onchocerciasis and loiasis co-endemic) East Region in Cameroon were tested for: i) *Loa* MFD in blood samples; ii) *O. volvulus* presence by SST, and iii) IgG4 antibody positivity to Ov16 by rapid diagnostic test (RDT). A Classification and Regression Tree (CART) model was used to perform a supervised classification of SST status and identify a *Loa* MFD threshold above which it is highly likely to find *L. loa* mf in skin snips.

### Results:

Of 1,011 Ov16-negative individuals, 28 (2.8%) tested SST positive and 150 (14.8%) were *L. loa* positive. The range of *Loa* MFD was 0–85200mf/mL. The CART model subdivided the sample into two *Loa* MFD classes with a discrimination threshold of 4080 (95% CI: 2180–12240) mf/mL. The probability of being SST positive exceeded 27% when *Loa* MFD was >4080mf/mL.

### Discussion/Conclusion:

The probability of finding *L. loa* mf by SST increases significantly with *Loa* MFD. Skin-snip polymerase chain reaction (PCR) would be useful when monitoring onchocerciasis prevalence by SST in onchocerciasis–loiasis co-endemic areas.