microfilaremia, antigenemia, and antifilarial antibody (Bm14). Since 2000, there has been a significant decrease of antigenemia in both sites as measured by immunochromatographic card test (ICT). From 2000 to 2005, ICT prevalence had dropped from 48.6% to 23.2% (p<0.001) in Centre Ville and from 36.8% to 8.2% (p<0.001) in Masson Mathieu. Because of an interruption of funds in 2006, there was no MDA in Leogane. In 2007, approximately two years after the most recent MDA, ICT prevalence increased to 31.5% in Centre Ville and 14.1% in Masson Mathieu, representing a significant recrudescence of infection in both areas. Furthermore, a total of 18 of 102 (17.6%) children <6 years old were found to be ICT positive, suggesting recent LF transmission. The potential for ongoing transmission was supported by finding both Bm14 and microfilaria-positive children. These data suggest that missed MDA cycles can be damaging to LF elimination programs, and that five or more rounds of MDA may not be enough to successfully interrupt transmission in highly endemic settings.

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RATES OF MICROFILARIAL PRODUCTION BY *ONCHOCERCA VOLVULUS* ARE NOT CUMULATIVELY REDUCED BY MULTIPLE IVERMECTIN TREATMENTS

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Regular distribution of ivermectin reduces onchocerciasis transmission and morbidity by killing microfilariae (microfilaricidal effect). In addition, ivermectin exerts an embryostatic effect, by which microfilarial production by adult female worms becomes suppressed during a number of weeks after treatment. To assess the overall effect of ivermectin on onchocerciasis transmission and evaluate the likelihood of local elimination of the infection it is important to estimate the magnitude of the anti-fertility effect over the course of a treatment program. We estimated the effect of repeated drug treatments on the production of microfilariae by *Onchocerca volvulus* by developing a mathematical model that was fitted to data collected from three hyperendemic communities of the central onchocerciasis focus in Guatemala. Eligible residents had received ivermectin twice per year for two and a half years. The data consist of microfilarial load measurements in the skin, collected just before each six-monthly treatment during the program. The model that is developed describes the dynamics of an individual host's expected microfilarial load over the 30-month study period. We adopt a Bayesian hierarchical approach and use Markov chain Monte Carlo techniques to fit the model to the data. Combining estimates from the three villages, average microfilarial production in the first six months post-treatment was reduced by approximately 64% of its pre-treatment level, regardless of values chosen for the pre-ivermectin fertility rate within plausible ranges. Increased adult worm death rate after treatment (to mimic removal of macrofilariae via nodulectomy during the program) resulted in a smaller estimated magnitude of the embryostatic effect (rate of microfilarial production was reduced by 58% of pre-ivermectin value). After subsequent treatments, the rate of microfilarial production appeared to be similarly decreased. The data and analyses therefore do not support the hypothesis of a cumulative effect of multiple ivermectin treatments on microfilarial production by female worms.

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DYNAMICS OF *ONCHOCERCA VOLVULUS* MICROFILARIAL LOADS OF CAMEROONIAN PATIENTS SUBMITTED TO REPEATED (5 - 23) IVERMECTIN TREATMENTS OVER 14 YEARS (1994 - 2007)

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The main effects of ivermectin (IVM) on *Onchocerca volvulus* are a microfilaricidal effect, leading to a rapid decrease in the microfilarial loads, and a temporary blockage of the release of microfilariae (mf) by the adult worms. The mf loads re-increase slowly from 3 months after treatment. While reports from Ghana suggest that this re-increase is more rapid in patients who have received many IVM doses, the long term impact of repeated IVM treatments on the dynamics of mf loads is still unclear. To evaluate this, mf loads have been monitored in 1994, 1997 and 2007 in a cohort of Cameroonian subjects. They all had received either 4 annual or 13 3-monthly IVM doses between 1994 and 1997 (during a closely monitored trial), and were proposed the drug during the subsequent years as part of annual community-directed treatments with IVM (CDTI). In 2007, information was collected from each individual about the date of their last dose. Mf loads measured in 1994 (before the 1st dose), 1997 (one year after the 4th dose), and 2007 (10 months after the last round of CDTI) in a group of 32 patients treated annually between 1994 and 1997 and who had actually taken IVM in 2006, were 137.7, 15.2 and 15.4 mf/mg, respectively. Thirty-eight other individuals had been treated either annually or three-monthly between 1994 and 1997, and had not participated in the CDTIs organised in 2006; in these patients, the mf loads measured in 1994 and 2007 were 99.5 and 47.3 mf/mg, respectively. When extending the non compliance period to more than 3 years, the mean mf load in 2007 was 109.2 mf/mg (14 subjects). 105 skin-snip positive individuals from the 1994 cohort were retreated in 2007 after the parasitological examination, and then followed up at 15, 80 and 180 days after treatment. Mf loads recorded on D15 showed that the microfilaricidal effect of IVM was similar to that classically reported. However, the mf prevalence observed at D80 (41%) and D180 (77%) and the significant mf loads observed at D180 (13% of individuals present with >10mf/mg) reflect the persisting reproductive capacities of some adult worms. These observations suggest that despite 13 years of intervening treatments halting IVM treatment could result in a rapid return to the initial hyperendemic state. Embryograms and genotyping of parasites collected as part of this study are underway to assess whether the repopulation rates of skin by mf observed in some individuals reflects an emerging resistance of *O. volvulus* to IVM.

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Dynamics of onchocerca volvulus microfilarial loads of cameroonian patients submitted to repeated (5-23) ivermectin treatments over 14 years (1994-2007)

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