

Additional File 1

Modelling Neglected Tropical Diseases diagnostics: the sensitivity of skin snips for *Onchocerca volvulus* in near elimination and surveillance settings

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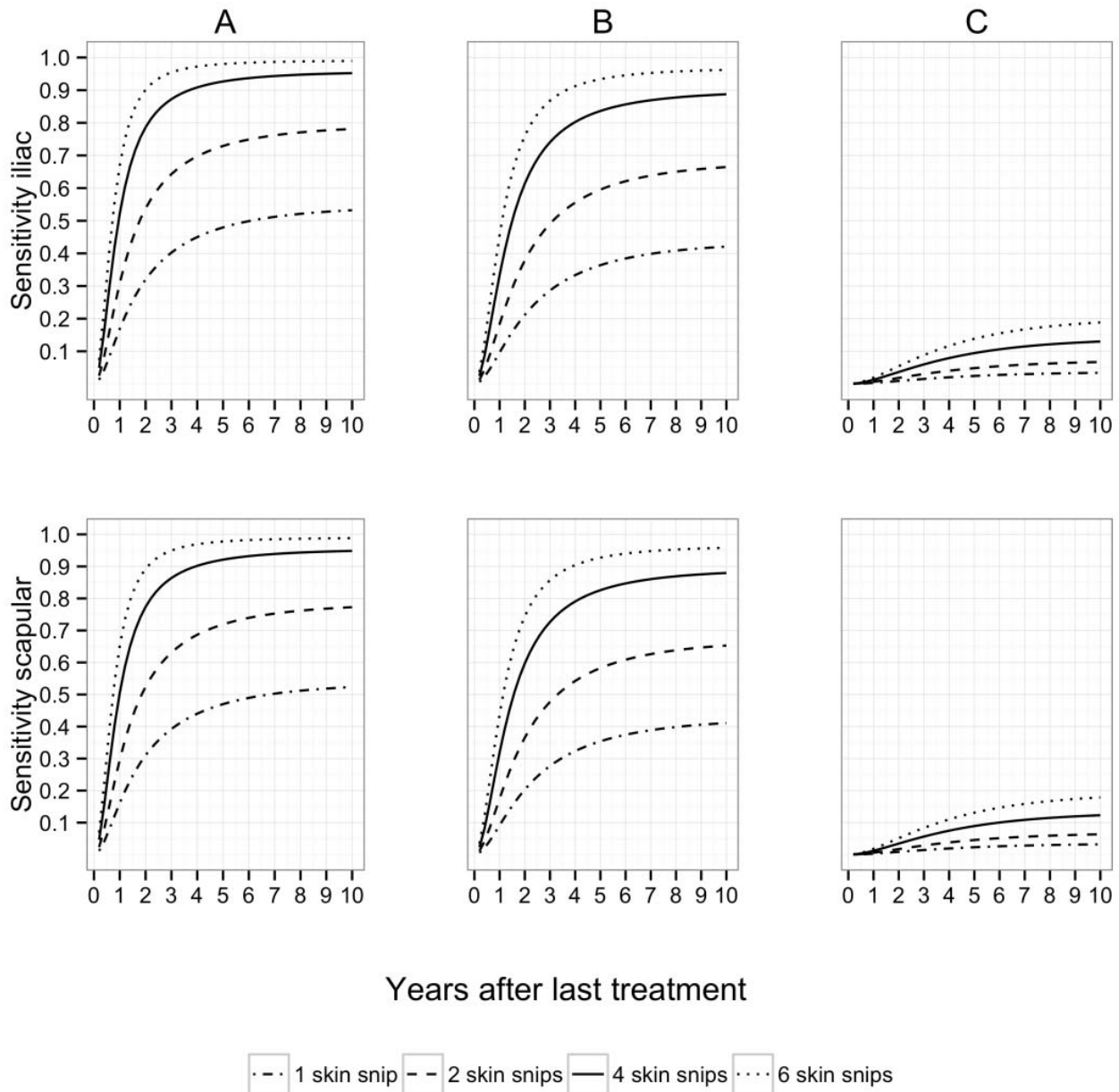
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Additional figures illustrating setting-specific sensitivity and the influence of microfilarial overdispersion

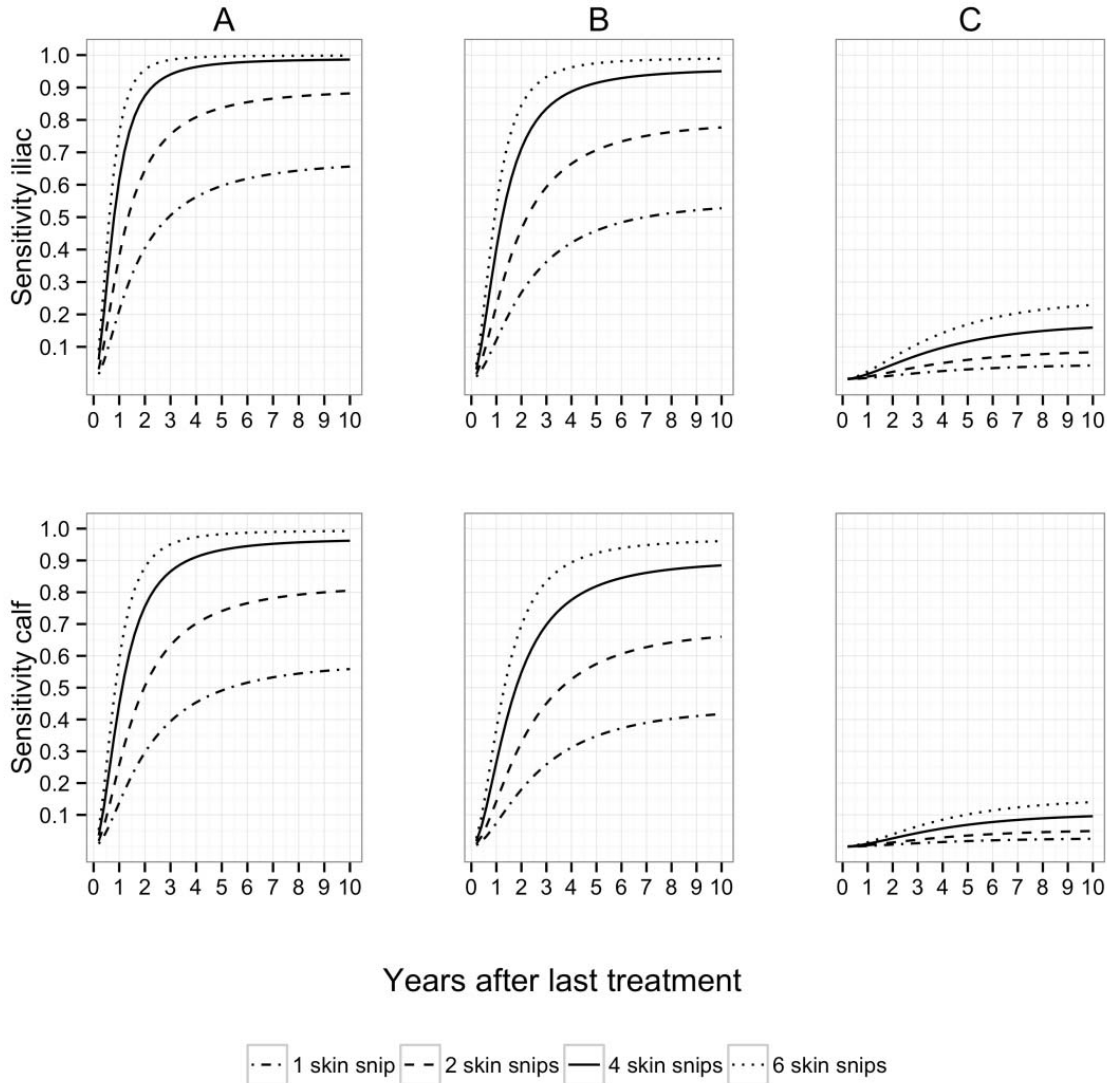
Figure S1. Sensitivity of the skin snip method in the Amazonian focus of southern Venezuela



The sensitivity of skin snips taken from the iliac crest (top row) is compared with the sensitivity of snips taken from the scapular region (bottom row). Three scenarios are explored for the effect of ivermectin on microfilarial production: (A) microfilarial production by adult female worms is independent of the number of previous exposures to ivermectin (i.e., $\zeta = 0$ [1]); (B) each round of treatment reduces microfilarial production by 7% ($\zeta = 0.07$ [2]); (C) each treatment round reduces

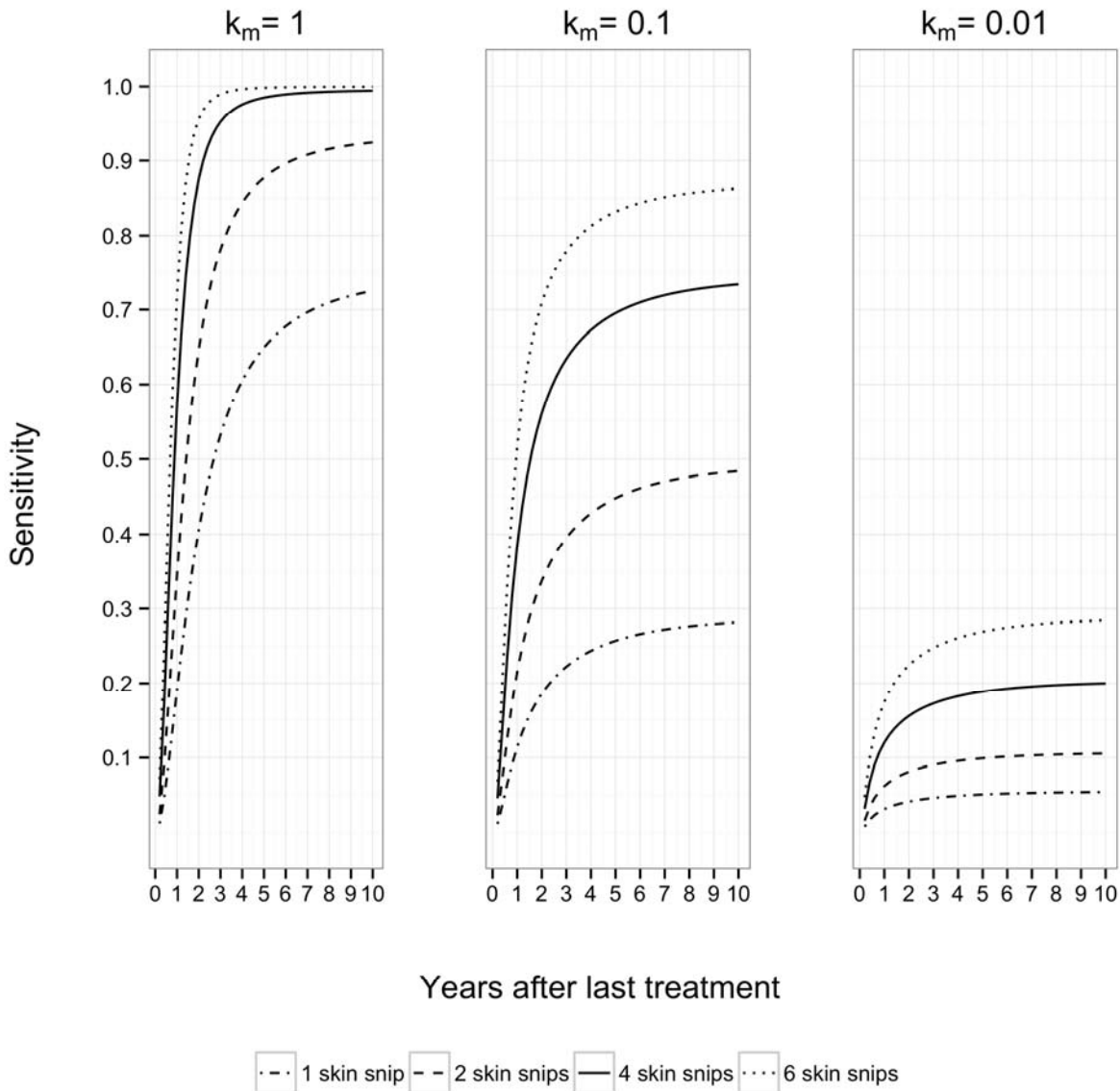
production by 35% ($\zeta = 0.35$ [3]). It is assumed that the worms have been exposed to 10 rounds of (annual) ivermectin treatment. Other parameter values are: microfilarial aggregation in the skin, $k_m = 0.48$ (Venezuela-specific estimate for 1–10 adult female worms), microfilarial mortality per year $\mu_m = 0.8$ (estimate from [4, 5]), resumption of microfilarial production per year $\rho = 0.29$ (estimate from [6, 7]), pre-treatment microfilarial production per fertile female worm per mg of skin in the iliac crest per year, $\varepsilon^{iliac} = 1.722$, in the scapula $\varepsilon^{scapula} = 0.586$ (estimated using $\alpha = \varepsilon^{scapula} / \varepsilon^{iliac} = 0.34$ from Table 3 in main text, and $(\varepsilon^{scapula} + \varepsilon^{iliac}) / 2 = \varepsilon^* = 1.154$ [8]). The dot-dash lines correspond to 1 snip; the dashed lines to 2 snips; the solid lines to 4 snips and the dotted lines to 6 snips.

Figure S2. Sensitivity of the skin snip method in the Volta region of Ghana



The sensitivity of skin snips taken from the iliac crest (top row) is compared with the sensitivity of snips taken from the calf (bottom row). Panels A to C are as defined in Figure S1. Other parameter values are: microfilarial aggregation in the skin, $k_m = 0.54$ (Ghana-specific estimate for 1–10 adult female worms), pre-treatment microfilarial production per fertile female worm per mg of skin in the iliac crest per year, $\varepsilon^{iliac} = 1.47$, in the calf $\varepsilon^{calf} = 0.838$ (estimated using $\alpha = \varepsilon^{calf} / \varepsilon^{iliac} = 0.57$ from Table 3 in main text, and $(\varepsilon^{calf} + \varepsilon^{iliac}) / 2 = \varepsilon^* = 1.154$ [8]). The dot-dash lines correspond to 1 snip; the dashed lines to 2 snips; the solid lines to 4 snips and the dotted lines to 6 snips.

Figure S3. Sensitivity of the skin snip method under different scenarios for the amount of microfilarial aggregation



The sensitivity of the skin snip method as a function of time (number of years) after the last ivermectin treatment is compared for $k_m = 1$, $k_m = 0.1$ and $k_m = 0.01$ to explore the influence of an increasing degree of microfilarial overdispersion. Other parameter values are: pre-treatment microfilarial production per fertile female worm per mg of skin per year, $\varepsilon^* = 1.154$ (estimate from [8]), microfilarial mortality per year $\mu_m = 0.8$ (estimate from [4, 5]), and resumption of microfilarial production per year $\rho = 0.29$ (estimate from [6, 7]). The dot-dash lines correspond to 1 snip; the dashed lines to 2 snips; the solid lines to 4 snips and the dotted lines to 6 snips.

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