

Enzyme-linked immunosorbent assay as an endgame diagnostic method for soil-transmitted helminth infections

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Abstract:

With the success of mass deworming programmes against soil-transmitted helminths (STH) and the known limitations of the current techniques, improved diagnostic methods are necessary to ensure detection of low-intensity infections. Immunoassays measuring antibody titres against specific STH antigens can provide a new way of measuring programme impact and recording rates of reinfection. A study was conducted in Bungoma District, western Kenya, where blood and stool samples were collected from 2273 individuals during two cross-sectional surveys in Mar-Apr and Aug-Sep 2014. Stool samples were analysed using duplicate Kato-Katz and intensity of infection recorded as eggs-per-gram (EPG). Plasma was extracted from the blood samples and analysed by indirect enzyme-linked immunosorbent assay (ELISA) to measure antibody titres against two *Necator americanus* recombinant proteins (Na-ASP-2 and Na-SAA-2) and two *Ascaris* antigens, *A. suum* haemoglobin (AsHb) and *A. lumbricoides* extract. Prevalence and intensity of infection were analysed together with antibody seroprevalence against the four antigens, searching for correlations between EPG and antibody titres at individual and community level, as well as changes in seroprevalence post-community-wide deworming. Despite a positive correlation between the age-prevalence profile of *N. americanus* and seroprevalence of Na-ASP-2, no other correlations were found between infection status or EPG levels and antibody titres, and no significant changes in seroprevalence were found three months after deworming treatment. There was also some evidence of cross-reactivity between the four antigens tested. Immunoassays might be used as alternative diagnostic methods in populations targeted by deworming programmes, but cross-reactivity between species and difficulties in distinguishing between past, prepatent and current infections remain. Their use might be limited to an analysis of community-wide exposure rather than accurate individual diagnosis of present or past infection. In the endgame, seroconversion in young children could be a good marker of continued exposure to infection.

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