

ABSTRACT

The Role of Environmental and Host Behavioural Factors
in determining Exposure to Infection with
Ascaris lumbricoides and Trichuris trichiura

Michael S. Wong

This study examines the contribution of environmental and host behavioural factors to the rate of reinfection with geohelminths in children. Preceding the field study, two practical procedures for estimating these factors were developed and standardised: first, a method, based on existing procedures, for extracting parasite eggs from soil samples; and second, an original method, based on the assessment of soil-derived silica from faeces, for quantifying the rate of soil ingestion (geophagia) by the study children.

In the field study, exposure to Ascaris lumbricoides and Trichuris trichiura was examined longitudinally at two Places-of-Safety (childrens' homes) in urban Kingston, Jamaica. At the start of the study, existing helminth infections were chemotherapeutically removed from the study populations who then naturally reacquired infection during a three month exposure period. At the end of this period the infection intensity was determined. Exposure to

infection was quantified by estimating the rate of ingestion of geohelminth eggs throughout the study period. This was achieved by determining the density of eggs in the soil and the rate of soil ingestion.

The eggs of both geohelminths were recovered from the soil at both localities. The mean egg densities ranged from 0.05 to 4.0 cpg-soil. The eggs were overdispersed in the soil at one locality and underdispersed at the other.

The estimated rate of egg ingestion (of each species) was overdispersed among the two populations. At the home with young children of relatively uniform age, there was a significant correlation between the rate of egg ingestion and the reacquired infection intensity: subjects who have a high rate of egg ingestion have high worm burdens. This correlation was not significant for the population of older children who were heterogeneous in age. It is suggested that the older subjects may have shown more restrained geophagic behaviour. Additionally, those who were more homogeneous in age, and perhaps susceptible to infection, tended to show a more direct relationship between the rates of egg ingestion and parasite establishment.

The study demonstrated that the number of parasites established in the host was of the same order of magnitude as the number of eggs ingested from soil. This implies that for the study populations, soil ingestion is a major source of geohelminth infection.