Public Health Practice

Not by drugs alone: the fight against parasitic helminths
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With particular reference to parts of eastern and southern Africa the authors outline the dire effects of parasitic worms on people in the tropics and subtropics. Helminth infections can be controlled with drugs but in the long term a more comprehensive approach is required, dealing with poverty, health care and education, living conditions, sanitation and water supplies.

Many millions of people in tropical and subtropical regions are infected by parasitic worms, among them *Acaris, Trichuris, Necator, Ancylostoma* and *Schistosoma*. Yet within weeks or months of treatment it is possible to achieve significant increases in children’s growth rates and in physical and mental energy levels, while morbidity and mortality decline.

The highest percentages of infected persons are found in the age range 3–18 years (1–3). As a rule, children carry the heaviest worm and egg burdens, and, because of their defecation practices, they are the principal disseminators of infection. High prevalence rates in the younger age groups generally indicate intense transmission, and special attention should therefore be given to the treatment of children (4). In Kenya, significant improve-
ments in appetite, growth, weight, physical fitness and spontaneous physical activity were observed in children after they had been treated against *Acaris, Trichuris, Schistosoma haematobium* and hookworms (5, 6).

However, treatment alone is not enough in poor, undernourished and often underserved communities, where reinfection can be expected to occur. Environmental measures have to be taken which require community involvement and government support, among them the following:

- the provision of safe water;
- research and development on and the introduction of sanitation systems that are acceptable and employ appropriate technology;
- the improvement of personal and community hygiene practices.

Such sustainable preventive measures and, where necessary, preschool feeding schemes, should be adopted in conjunction with repeated community treatment. Population
growth rates should be taken into consideration so that the benefits of primary care programmes can continue to cover all members of communities.

*Ascaris*, *Trichuris* and hookworms are highly endemic in certain parts of South Africa, particularly in dense settlements on the northern, eastern, southern and south-western margins of the country. Inland, conditions are less suitable for the dissemination of *Trichuris*, and human hookworms have not been recorded in the southern and south-western areas (1–3).

**Hookworms**

The hookworms *Ancylostoma duodenale* and *Necator americanus* cause loss of blood and protein, and this often results in anaemia, especially in girls and pregnant women. Among the consequences of anaemia during pregnancy are an increased risk of maternal and fetal morbidity and mortality, premature delivery and low birth weight. Anaemia in children causes retarded physical and mental development, decreased resistance to infection and increased morbidity, especially in those below school age. Fatigue and a decreased capacity for work may stem from anaemia in older children and adults, and substantial socioeconomic development is unlikely to be achieved if the prevalence of this condition is not reduced.

*N. americanus* is the more common species of hookworm in the southern part of Africa. Its range varies from the sparsely populated semidesert of Namibia where prevalence is high, *Trichuris* and *Strongyloides* are endemic (7), nutrition is poor and many children are anaemic, to the densely populated, well-watered eastern margins of KwaZulu where children are better nourished, anaemia is less common, and *Schistosoma haematobium*, *Ascaris* and *Trichuris* occur (1, 3). Although prevalence rates of *N. americanus* of 40–90% have been reported in some areas, egg outputs are generally only low to moderate (1, 3) in comparison with those observed in eastern Africa (5).

Intestinal nematodes can now be controlled effectively, safely and inexpensively, using a single oral dose of 500 mg mebendazole or 400 mg albendazole (8). Chemotherapy removes the worm burden, morbidity is immediately alleviated, and the rate of transmission may be reduced. Repeated treatment ensures that, even if reinfection occurs, the worm burden is maintained below the level associated with significant morbidity. This approach is likely to make a major contribution to, for example, the prevention of protein-energy malnutrition and iron-deficiency anaemia, estimated to affect globally at least 500 million children and 800–900 million people in all (8). Deworming is essential before iron deficiency can be made good through dietary supplementation.

**Schistosomes**

Schistosomiasis affects about four million people in South Africa, and many thousands more are exposed to infection. The dominant species causing the disease is *Schistosoma haematobium*. Morbidity, which is highly prevalent among schoolchildren in endemic areas, frequently involves lassitude and painful urination. Polyparasitism occurs, and cases of swollen liver are described sporadically. There have been reports of 100% infection involving both species of human schistosome. Morbidity is often particularly severe because schistosome infection is invariably accom-
panied by one or more of the intestinal nematode parasites, as also happens in Kenya (5). The orally administered drugs most commonly used against schistosomes are metrifonate, which is effective against urinary infection and reduces hookworm burdens, and praziquantel, which is effective against both bowel and urinary infections.

**Strongyloides**

Because of the importance of autoinfection, the invasive attacks made on the gut epithelium, and the association between infection with *Strongyloides stercoralis* and transmission via breast milk, all surveys of intestinal nematodes in Africa should record the prevalences and quantify the larval and egg outputs of this species and *S. stercoralis*. Communities in which *Strongyloides* species are a public health problem should be identified, and an attempt should be made to control these parasites.

**Targets and recommendations**

In areas where helminth parasites are endemic, schools should serve as survey and treatment centres (4, 5, 8, 9), and clinics should be sited on school grounds where possible. In terms of targeting for disease control, schoolchildren should be at the centre of attention. They harbour some of the most intense helminth infections, which have adverse effects on health, growth and school performance. Immediately surrounding them are the preschool children and adults who are influenced by activities that take place in schools. An outer fringe consists of scattered communities where children benefit from school activities but where the introduction of sanitation, safe water supplies and other preventive measures may be delayed.

In areas where more than 25% of children are mildly to moderately underweight and where parasites are known to be widespread, high priority should be given to deworming programmes (10). Treatment without prior individual screening of the whole population is recommended where surveys of school-age children indicate that the prevalence of intestinal helminths or schistosome infection exceeds 50% (4). Growth retardation begins in infected preschool children and is most dangerous in this age group. The deworming of young children infected with parasites, and of mothers in areas where hookworms and schistosomes are endemic, merits serious consideration.

The long-term solution to malnutrition and helminth control lies in the eradication of poverty and in community-based programmes to improve health care, living conditions, sanitation, water supplies, and education and guidance on health matters. Such measures should be taken in conjunction with treatment programmes.

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**References**


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**Global malaria control strategy**

The goal of malaria control is to prevent mortality and reduce morbidity and social and economic losses, through the progressive improvement and strengthening of local and national capabilities. The four basic technical elements of the strategy are:

- to provide early diagnosis and prompt treatment;
- to plan and implement selective and sustainable preventive measures, including vector control;
- to detect early, contain or prevent epidemics;
- to strengthen local capacities in basic and applied research to permit and promote the regular assessment of a country's malaria situation, in particular the ecological, social and economic determinants of the disease.