

# THE UNIVERSITY OF WARWICK

**Original citation:**

Medley, Graham and Hollingsworth, T. Déirdre (2015) Helminth control : more questions than answers. *The Lancet Global Health*, 3 (10). e583-e584

[http://dx.doi.org/10.1016/S2214-109X\(15\)00089-3](http://dx.doi.org/10.1016/S2214-109X(15)00089-3)

**Permanent WRAP url:**

<http://wrap.warwick.ac.uk/69715>

**Copyright and reuse:**

The Warwick Research Archive Portal (WRAP) makes this work of researchers of the University of Warwick available open access under the following conditions.

This article is made available under the Creative Commons Attribution 4.0 International license (CC BY 4.0) and may be reused according to the conditions of the license. For more details see: <http://creativecommons.org/licenses/by/4.0/>

**A note on versions:**

The version presented in WRAP is the published version, or, version of record, and may be cited as it appears here.

For more information, please contact the WRAP Team at: [publications@warwick.ac.uk](mailto:publications@warwick.ac.uk)

warwick**publications**wrap

highlight your research

<http://wrap.warwick.ac.uk>

## MDA helminth control: more questions than answers



See [Articles](#) page e629

Soil-transmitted helminths (STH) and schistosomiasis have been recognised as important diseases. Diagnostics, treatments, and understanding of these were accrued throughout the 20th century, and reached the point that control and elimination seemed to be mostly a matter of implementation of mass drug administration (MDA) programmes.<sup>1</sup> However, in 2015, both STH and schistosomiasis are global health problems, so perhaps we do not have the right methods or they are not being effectively applied. To our knowledge, MDA for STH and schistosomiasis has never been reported to eliminate infection without concomitant economic development. What are we missing?

Most understanding about infection and disease is from longitudinal intervention studies completed in the 1980s and 1990s,<sup>2,5</sup> which are now ageing and rarely benefited from modern techniques, such as next-generation sequencing. Very surprising is how much is not fully understood about these infections—eg, the biological or ecological basis of predisposition to high worm burdens, the importance of household-based transmission, the causes and resulting effects of co-infection with many parasites, and how to measure the burden of disease.

Measurement of the burden of disease is particularly vexing. Cochrane reviews, published in 2012<sup>6</sup> and 2015<sup>7</sup>, have emphasised the paucity of information (only 42 and 45 papers were included, respectively) and reported that little evidence was available for any beneficial effect of deworming, even though people in the field were convinced that these result in a great effect on physical and mental health.<sup>8</sup> By contrast, evidence of the effects in livestock and wildlife is accruing.<sup>9</sup> More than 1 billion children worldwide live at risk of helminth infection,<sup>10</sup> and yet the effect on their health and development still cannot be quantified.

In *The Lancet Global Health*, Nathan Lo and colleagues<sup>11</sup> introduce two advances that should be highlighted. First is the inclusion of five different parasites in the same study, which is sensible, in view of the substantial overlap in diagnostic procedures and treatments for the different species. Second, the authors<sup>11</sup> worked with detailed data in one setting (Côte d'Ivoire) and made comparisons between different communities within that setting; such linkage between consistent local data

and models is rare. Helminth infection and disease can be very different in different communities, but well validated models in many settings might allow for the extrapolation to others. We would like to think that this paper<sup>11</sup> marks the demise for universal studies of single helminth species.

Lo and colleagues<sup>11</sup> also add to the evidence that MDA might need to be widened beyond school-aged children (5–14 years). Different frequencies of treatment are known to be needed for communities with different intensities of infection, but less appreciated is that different age groups need to be treated for different circumstances, particularly with the aim to stop transmission of infections.<sup>12</sup> Lo and colleagues' results<sup>11</sup> suggest that widening coverage to additional age groups could be highly cost effective in terms of disability-adjusted life-years averted, motivating wider treatment programmes for effect rather than purely for the aim of local elimination.

Generally, we need interventions that are sustainable in the face of social, economic, and ecological heterogeneities. Models need to guide intervention programmes in terms of what to measure and how to use this information to manage the intervention. However, this task is difficult for modellers to provide because detailed data from many settings do not exist; or in settings where data do exist, the mechanisms to share these are not available in a way that provides useful results for both individual countries and wider policy formulation.

Lo and colleagues' study<sup>11</sup> emphasises the need for additional longitudinal studies of infection and disease—with longer follow-up time than have been done previously, especially if the negative sequelae of infection in children starts while they are very young and lasts for decades. Such future studies need a broadening of research approaches, particularly to include multiparasitism, the concepts of parasite tolerance (ie, that some individuals can harbour high burdens with relatively little effect on their health), social dimensions (ie, people with the highest burdens are less likely to be included in interventions and research studies, possibly because of their high burden, than those with low burdens), and potential reservoirs of transmission (ie, the role of households and environmental

contamination). Confounders and mediators (eg, nutrition, poverty, and microbiota) also need to be taken into account.

Of course, it should be emphasised that whether MDA can eliminate transmission, or whether it will ultimately need improvement in the quality of the water supply, sanitation, and hygiene, is yet to be shown. Nonetheless, MDA is the mainstay of control for the present generations, and we need to know whether, and how, we should use this method.

\*Graham F Medley, T Deirdre Hollingsworth

London School of Hygiene & Tropical Medicine, London WC1E 7HT, UK (GFM); and University of Warwick, Coventry, UK (TDH)  
 graham.medley@lshtm.ac.uk

We declare no competing interests.

Copyright © Medley et al. Open Access article distributed under the terms of CC BY.

- 1 WHO. World Health Organization technical report series, 749: prevention and control of parasitic infections, 1987. [whqlibdoc.who.int/trs/WHO\\_TRS\\_749.pdf](http://whqlibdoc.who.int/trs/WHO_TRS_749.pdf) (accessed Aug 21, 2015).
- 2 Butterworth AE, Sturrock RF, Ouma JH, et al. Comparison of different chemotherapy strategies against *Schistosoma mansoni* in Machakos District, Kenya: effects on human infection and morbidity. *Parasitology* 1991; **103**: 339–55.
- 3 Bundy DAP, Wong MS, Lewis LL, Horton J. Control of geohelminths by delivery of targeted chemotherapy through schools. *Trans R Soc Trop Med Hyg* 1990; **84**: 115–20.
- 4 Elkins DB, Haswell-Elkins M, Anderson RM. The epidemiology and control of intestinal helminths in the Pulicat Lake region of Southern India: I—study design and pre- and post-treatment observations on *Ascaris lumbricoides* infection. *Trans R Soc Trop Med Hyg* 1986; **80**: 774–92.
- 5 Holland CV, Asaolu SO, Crompton DWT, Whitehead RR, Coombs I. Targeted anthelmintic treatment of school children: effect of frequency of application on the intensity of *Ascaris lumbricoides* infection in children from rural Nigerian villages. *Parasitology* 1996; **113**: 87–95.
- 6 Taylor-Robinson DC, Maayan N, Soares-Weiser K, Donegan S, Garner P. Deworming drugs for soil-transmitted intestinal worms in children: effects on nutritional indicators, haemoglobin and school performance. *Cochrane Database Syst Rev* 2012; **7**: CD000371.
- 7 Taylor-Robinson DC, Maayan N, Soares-Weiser K, Donegan S, Garner P. Deworming drugs for soil-transmitted intestinal worms in children: effects on nutritional indicators, haemoglobin, and school performance. *Cochrane Database Syst Rev* 2015; **7**: CD000371.
- 8 Montresor A, Gabrielli AF, Engels D, Daumerie D, Savioli L. Has the NTD community neglected evidence-based policy? *PLoS NTDs* 2013 expert commentary of the viewpoint by Nagpal S, Sinclair D, Garner P. *PLoS Negl Trop Dis* 2013; **7**: e2299.
- 9 Hayward AD, Garnier R, Watt KA, et al. Heritable, heterogeneous, and costly resistance of sheep against nematodes and potential feedbacks to epidemiological dynamics. *Am Nat* 2014; **184** (suppl 1): S58–76.
- 10 Pullan RL, Smith JL, Jaisasaria R, Brooker SJ. Global numbers of infection and disease burden of soil transmitted helminth infections in 2010. *Parasit Vectors* 2014; **7**: 37.
- 11 Lo NC, Bogoch II, Blackburn BG, et al. Comparison of community-wide, integrated mass drug administration strategies for schistosomiasis and soil-transmitted helminthiasis: a cost-effectiveness modelling study. *Lancet Glob Health* 2015; **3**: e629–38.
- 12 Anderson RM, Truscott J, Hollingsworth TD. The coverage and frequency of mass drug administration required to eliminate persistent transmission of soil-transmitted helminths. *Philos Trans R Soc Lond B Biol Sci* 2014; **369**: 20130435.