

- 24 Delacollette, C. and Barutwanayo, M. (1993) Mortalite et morbidite aux jeunes ages dans une region a paludisme hyperendémique stable, commune de Nyanza Lac, Imbo Sud, Burundi. *Bulletin de la Société de Pathologie Exotique* 86, 1–7
- 25 Barnish, G. *et al.* (1993) The epidemiology of malaria in southern Sierra Leone. *Parasitologia* 35, 1–4
- 26 Snow, R.W. *et al.* (1994) The role of the district hospital in child survival at the Kenyan coast. *African J. Health Sci.* 1, 71–75
- 27 Binka, F.N. *et al.* (1996) Impact of permethrin-impregnated bed nets on child mortality in Kassena-Nakana district, Ghana: a randomised controlled trial. *Trop. Med. Int. Health.* 1, 147–154
- 28 Government of Tanzania (1997) *Policy implications of adult morbidity and mortality: end of Phase 1 report.* Ministry of Health, Dar es Salaam, Republic of Tanzania.
- 29 Premji, Z. *et al.* (1997) Community based studies on childhood mortality in a malaria holoendemic area on the Tanzanian coast. *Acta Tropica* 63, 101–109
- 30 Salum, F.M. *et al.* (1994) Mortality of under fives in a rural area of holoendemic malaria transmission. *Acta Tropica* 58, 29–34
- 31 Craig, M.H. *et al.* (1999) African climatic model of malaria transmission based on monthly rainfall and temperature. *Parasitol Today* 15, 105–111.
- 32 Ewbank, D.C. and Gribble, J.N. (1993) *Effect of Health Programs on child mortality in sub-Saharan Africa.* National Academy Press, Washington DC, USA. p. 191.
- 33 Hill, A. (1992) Trends in childhood mortality in sub-Saharan mainland Africa. In *Mortality and Society in sub-Saharan Africa* (Van de Walle, E. *et al.*, eds) pp. 10–31, Clarendon Press
- 34 Castro-Leal, F. *et al.* (2000) Public spending on health care in Africa: do the poor benefit? *Bull. WHO* 78, 66–74
- 35 Snow, R.W. *et al.* (1992) Childhood deaths in Africa: Uses and limitations of verbal autopsies. *Lancet* 340, 351–356
- 36 League of Nations (1936) Malaria under African conditions. *Q. Bull. Health Organ. League of Nations* 5, 134–137
- 37 Colbourne, M.J. (1966). *Malaria in Africa.* Oxford University Press, pp. 29–49
- 38 Sachs, J. (1999) Helping the World's poorest. *The Economist*, 14 August, pp. 17–20
- 39 World Health Organisation (2000) *The Abuja declaration on Roll Back Malaria in Africa by the African heads of State and Government, 25<sup>th</sup> April 2000, Abuja, Nigeria.* Statement prepared by RBM, World Health Organisation, Geneva
- 40 Litsios, S. (1998) Arnoldo Gabaldon's independent path for malaria control and public health in the Tropics: a lost 'paradigm' for WHO. *Parassitologia* 40, 231–238
- 41 Packard, R.M. (1998) 'No other logical choice': Global malaria eradication and the politics of international health in the post-war era. *Parassitologia* 40, 217–229
- 42 Foster, S. (1995) Treatment of malaria outside formal health services. *J. Trop. Med. Hyg.* 98, 29–34
- 43 Creese, A. (1991) User charges for health care: a review of recent experience. *Health Policy and Planning* 6, 309–319
- 44 Mouchet, J. *et al.* (1998) Evolution of malaria in Africa for the past 40 years: impact of climatic and human factors. *J. Am. Mosquito Control Assoc.* 14, 121–130
- 45 Greenberg, A.E. *et al.* (1989) Hospital-based surveillance of malaria-related paediatric morbidity and mortality in Kinshasa, Zaire. *Bull. WHO* 67, 189–196
- 46 Shanks, G.D. *et al.* (2000) Changing patterns of clinical malaria since 1965 among a tea estate population located in the Kenyan highlands. *Trans. R. Soc. Trop. Med. Hyg.* 94, 253–255

# Parasites that cause problems in Malaysia: soil-transmitted helminths and malaria parasites

Balbir Singh and Janet Cox-Singh

Malaysia is a developing country with a range of parasitic infections. Indeed, soil-transmitted helminths and malaria parasites continue to have a significant impact on public health in Malaysia. In this article, the prevalence and distribution of these parasites, the problems associated with parasitic infections, the control measures taken to deal with these parasites and implications for the future will be discussed.

Malaya, occupying a strategic position in South East Asia, has played a historically important role in the study of parasitic diseases in the tropics. The Institute for Medical Research (Kuala Lumpur, Malaysia), which celebrated its centenary last year, carried out most of the pioneering work on tropical diseases, particularly on malaria and filariasis (<http://www.imr.gov.my>). The modern Malaysian Federation, comprising Peninsular Malaysia (formerly Malaya), and the Malaysian Borneo States of Sabah and Sarawak, was formed in 1963 and has maintained the tradition in research and the control of parasitic diseases (Table 1). The Malaysian population of ~22 million (<http://www.statistics.gov.my>) occupies

diverse environmental niche areas and, although migration to cities is common, a significant proportion of the population remains in remote rural areas where parasitic infections are prevalent.

## Soil-transmitted helminths

*Ascaris lumbricoides*, *Trichuris trichiura* and hookworms are the most common intestinal parasitic infections of medical importance in Malaysia. However, it is difficult to estimate with certainty the current overall incidence of infection with soil-transmitted helminths (STHs) among the Malaysian population. The last large-scale survey of STHs was undertaken in 1991 and involved 9863 samples from 43 squatter communities around the capital, Kuala Lumpur<sup>1</sup>. The results of this survey, comprising individuals from all age groups, indicated an overall prevalence of STH infection in 58% of the population (*T. trichiura*, 49%; *A. lumbricoides*, 33%; and hookworm, 6%) and did not differ significantly from results obtained in a large-scale survey

Balbir Singh\*  
Janet Cox-Singh  
Faculty of Medicine and  
Health Sciences,  
Universiti Malaysia  
Sarawak, 94300 Kota  
Samarahan, Sarawak,  
Malaysia.  
\*e-mail:  
bsingh@fhs.unimas.my