What Should Schools Do About Malaria?

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Washington, DC, USA
November 1999

Roll Back Malaria (RBM) is a partnership, including WHO, UNICEF, UNDP and the World Bank, which aims to halve the global malaria mortality burden by the year 2010. The World Bank is a partner in this initiative not only through its support to governments for implementation, but also through the World Bank's experience in working across sectors. An intersectoral approach to rolling back malaria is likely to be more sustainable and cost-effective, and the RBM team at the World Bank is already working with the infrastructure and environment sectors to explore opportunities for concerted action.

From an Education Sector perspective, school health programmes aim to improve learning and educational outcomes through enhanced health and nutrition. By this definition, is malaria a priority problem for the Education Sector? And if control is justified, is the education service – the school, the teachers – a good or appropriate means for health promotion or health service delivery?

The Education Sector already recognizes the importance of health to schoolchildren. The child-friendly schools of UNICEF, the health promoting schools of WHO and the International School Health Initiative of the World Bank, are all part of global efforts to improve educational outcomes and access to health facilities, as defined in the Education for All initiative taken forward by UNESCO. But whether school health, hygiene and nutrition programmes should contribute to malaria control, and how they might do this, have not been fully explored.

A seminar was held to initiate the process of clarifying the role of the education sector in malaria control. Box 1 details the conclusions that provide an evidence-based agenda for future debate and research, but which also serve as a framework for developing country-specific strategies.

Reviewing the Evidence

Bob Snow (Kenya Medical Research Instititute/Wellcome Trust Research Centre, University of Oxford, UK) presented derived age-structured disease burden estimates for sub-Saharan Africa from a database of mortality and morbidity surveys of African schoolchildren, constructed by the Wellcome Trust-funded Burden of Malaria in Africa (BOMA) initiative.

This analysis indicated that, in areas of stable transmission, malaria is most common and severe in children younger than school age, but remains an important cause of mortality (10–20% of all cases) and morbidity in schoolchildren (BOMA, unpublished). Moreover, in areas of low, unstable transmission, schoolchildren may be at greater risk of severe and fatal consequences of infection, because of the slow build up of exposure-driven immunity[1]. However, these risks are balanced by the low, and often very seasonal, exposure to the parasite. At special risk of complications with infection are primagravid women. Teenage schoolgirls who become pregnant may therefore be at particular risk – in Tanzania, for example[2], early pregnancy already accounts for 61% of teenage-girl drop out.

In terms of an impact on educational outcomes, malaria accounts for <3–8% of all reasons for absenteeism[3–5]. Of preventable medical causes of absenteeism, malaria accounts for 13–50% of all school days missed per annum (p.a.) (eg. in Kenya, an estimated 4–10 million schooldays are lost p.a. because of malaria). The evidence also suggests that brain insult, as a consequence of cerebral malaria in early childhood, may have an effect on a child's cognitive and learning ability: residual neurological sequelae may hinder the developmental progress of 1–5% of children infected early in life[6].

Simon Brooker (University of Oxford, UK) with a team from the Kenya Medical

Box 1. Clarifying the Role of the Education Sector in Malaria Control

The conclusions from the seminar serve as a framework for developing country-specific strategies.

How important is malaria in schoolchildren?

For the health sector in Africa, the priority age group is younger than school age. Schoolchildren suffer much less mortality and morbidity, although the pregnant schoolgirl may be an exception to this generality. In areas of unstable transmission, disease may be more significant in schoolchildren, but is infrequent.

For the education sector in Africa, malaria is of substantial importance with regard to Early Child Development Programmes. In schoolchildren, malaria represents 3–8% of all cause absenteeism, and up to 50% of readily preventable absenteeism. Mortality is low in schoolchildren, but 15–20% is because of malaria. Prevention of early malaria may be important to the educational achievement of children at school age.

For both sectors in Asia, schoolchildren are significantly affected by malaria in endemic areas and are a priority group.

What can schools do about malaria?

Children can be important agents for change. Health education through schools can help promote a community-wide understanding of malaria and the need for control can create a demand for health services (both private and public) to provide universal access to affordable and appropriate treatment.

Skills-based health education can promote the prevention of disease by encouraging the use of impregnated bednets and the recognition of environmental risks. Schools can serve as the community focus for synchronized impregnation of bednets. The adoption by children of lifelong healthy behaviours can benefit not only the individual, but also the next generation of children.

Options

The management of treatment by and in schools appears an unaffordable and unattractive option. However, the promotion by schools of prompt and effective presumptive treatment provides an affordable option. Skills-based health education can give children the ability to recognize the signs and symptoms of malaria, to recognize the need to seek treatment, and to differentiate symptomatic from curative treatment. Skills-based approaches already target early programmes and reproductive health and this should now include messages repeating the specific risks of malaria in early pregnancy.

These education sector activities require an effective partnership with the health sector to achieve full impact. It is the health sector that retains overall responsibility for malaria control, and for the technical content of all advice and actions through schools. There is a particular need for consistent drug policies that promote universal access to affordable and appropriate treatment. A policy that was able to promote a single, readily recognizable 'malaria treatment' that was readily available from multiple sources would greatly simplify the task of promoting prompt and effective presumptive treatment.

0169-4758/00/$ – see front matter PII: S0169-4758(00)01658-6

Research Institute, performed an analysis of original data and formative research of the possible options for direct malaria control in schoolchildren in Kenya, with programme per capita costs ranging from US$0.10 per treated child using a weekly chemoprophylaxis regimen to US$88 per treated child by selective treatment of infected children only (see Brooker *et al.*, this issue). Within Kenya, there exists a wide spectrum of disease settings that can crudely be divided into stable and unstable transmission areas. Under both conditions, provision, through schools, of chemoprophylaxis, mass drug administration, selective treatment of infections and fever management with diagnostics were all considered unaffordable. Stakeholder analysis suggested a consensus from both government and non-government representatives of the health and education sectors that prompt, presumptive treatment was both affordable and sustainable, whether delivered through schools or not.

The Government of Senegal is currently developing an Education For All strategy that includes a strong school health component. Malick Sembene (Ministry of Education, Dakar, Senegal) discussed the role of malaria in relation to an analysis he had conducted jointly with Bacary Sambou (Ministry of Health, Dakar, Senegal) and Omar Gaye (University of Dakar, Senegal). Average infection in schoolchildren is 30–50%, but is most common in the southern zone where 62% of schoolchildren are infected.

Malaria has become a particular problem in the Senegal River Valley area where the construction of two dams has resulted in ecological changes. Severe flooding during the rainy seasons of 1996–1998 resulted in a change from malaria being seasonal, and relatively rare, to malaria being transmitted throughout the year. The 7–12-year age group (70 000 children) were most affected: many deaths of schoolchildren were attributed to malaria; absenteeism caused by malaria attacks was 70%. This situation remains a concern and there exists a risk of more intense effects in early 2000 following a severe rainy season and flooding.

Jean-Francois Trape (Institut de Recherche pour le Développement, Toulouse, France) presented an analysis of the impact of malaria and absenteeism. He compared the impact of clinical malaria in schoolchildren in areas of intense perennial transmission (the Congo), with areas of low seasonal transmission (Senegal), as defined by the entomological inoculation rate. In the Congo, infection was age dependent and was maximal in younger schoolchildren. The malaria daily absence rate was 0.3%, representing 5% of all causes of absence. The number of schooldays lost was <1 day per child p.a. This contrasted with areas of low seasonal transmission in Senegal where a similar incidence was observed in all age groups, with incidence varying according to the season of year. The average daily absence rate was 0.2%, representing <5% of all causes of absence. The number of schooldays lost was 0.2–1 day per child p.a.[4,5].

Christine Luxemburger (Shoklo Malaria Research Unit and Oxford-Mahidol Tropical Medicine Research Programme, Thailand; supported by the Wellcome Trust, UK) presented data on malaria in schoolchildren in Thailand and Vietnam – a very different picture from Africa. In these countries, *Plasmodium falciparum* and *P. vivax* are coendemic; parasite transmission is low and unstable, with many areas malaria free. Her analysis of malaria in Thailand focused upon the Karen refugee camp population (100 000) on the Thai–Myanmar border. In this population, malaria is common and severe across all age groups. The mortality rate in schoolchildren is 3 per 1000 children and 27% of malaria deaths occur in schoolchildren. Children experience 1.2 new infections p.a. that result in 1–7 febrile malaria episodes (counting recrudescences and relapses). Children are absent from school for 2–3 days per attack. In Vietnam, prevalence surveys indicate that schoolchildren are more exposed to malaria than younger children and represent an important proportion of malaria cases[7,8].

Acknowledgements
The seminar, held in Washington, DC, 29 November 1999, was hosted jointly by the International School Health and RBM teams at the World Bank.

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