

CORRESPONDENCE

microorganisms are activated when the cloth or stone is put in warm milk. In case any readers know of any other geo-myth, please share it with others by sending it to i2i@geologydata.info.

1. Sinha Roy, S., Mahapatra, G. and Mohanty, M., *Geology of Rajasthan*, Geol. Soc. India, Text Book Series. 1998, pp. 207–208.

2. <http://www.stratigraphy.org/meso.htm>, April 2005.
3. <http://www.britannica.com>, April 2005.
4. <http://www.chem.wise.edu>, April 2005.
5. <http://www.itisacqui.it>, April 2005.

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Malaria millennium development goals, treatment costs and generics

Malaria is endemic in many developing countries, particularly in the tropical and subtropical regions. The full extent of the epidemic cannot be measured because many cases of malaria are not clinically diagnosed or reported. The World Health Organization (WHO) estimates that 300–500 million cases occur each year; this leads to more than one million deaths¹. Almost 90% of all cases occur in Sub-Saharan Africa; children are the most affected and malaria may account for as much as 25% of child mortality in this region. The economic burden of epidemics such as malaria on families and communities is enormous. Estimates suggest that malaria slows economic growth in Africa by about 1.3% a year². Goal 6 of the Millennium Development Goals emphasizes on reducing morbidity and mortality due to malaria, tuberculosis and HIV/AIDS². Accordingly, deaths due to malaria should be halved and the year 2015 is the deadline for halting malaria spread. A recent estimate revised the number of malaria cases up to 500 million in Africa. This clearly indicates that various programmes, such as Roll Back Malaria initiated by WHO, are not producing the desired results.

One of the neglected issues in the discussion on achieving the goals related to malaria is treatment costs and the role of generic drug manufacturers. Greenwood *et al.*¹ report the direct cost of malaria treatment as US\$ 2–5 per person per event. We conducted an analysis of retail costs of treatment of a single episode of malaria in India using data from an Indian pharmaceutical manufacturers' index (*Indian Drug Review*, Mediworld Publications, New Delhi, 2005). According to this publication, the mean retail cost of various anti-

malarial drugs in Indian rupees is: chloroquin 6.73, primaquin 44.24, sulphazoxazole–pyrimethamine 8.36, quinine sulfate 208.32, mefloquin 219.05, proguanil 157.50, artether 246.99, artesunate 246.90, artemether 223.80, and doxycycline 117.60. Recently, however, combination therapies have been recommended for malaria control and eradication³. These combinations include artemisinin-based drugs along with conventional antimalarials. In India, retail costs of such combinations are chloroquin–primaquin 50.97, quinine–primaquin 252.56, sulfazoxazole–pyrimethamine–artemisinins 247.59, quinine–artemisinins 447.55 and mefloquine–artemisinins 458.28. This translates into US\$ 5–10 per person per treatment at retail prices and US\$ 3–7 at wholesale prices. This amount is not different from the older and largely ineffective non-artemisinin-based therapies used in Africa¹. Malaria mortality in India has fallen by 85% in the last five years, whereas the various programmes in Africa do not report any significant improvement. This clearly implies that in the African region people still use old medicines to counter malaria. This may be due to the fact that large multinational pharmaceutical companies use these less developed countries to dump their outdated drugs. On the other hand, in India the drug policies coupled with positive approach of pharmaceutical industry have improved affordability and availability of new drugs.

The World Trade Organization (WTO) and the World Bank can also play an important role in the control of prices of drugs. World Bank has projected an additional US\$ 1 billion over a period of five years for prevention of malaria, of which Africa would get the largest share. While

in India, they have decided to spend a total sum of US\$ 200 million over a period of five years for the same project. An important responsibility of WTO is in stopping the malaria epidemic, but the debate is whether or not WTO is the best place to enforce intellectual property rights. From an economics point of view, free trade is good because it offers gains to all trading partners by reducing domestic prices of goods and services they import. Unfortunately, the Trade Related aspects of Intellectual Property Rights agreement cannot guarantee such a positive outcome. Most of the developing countries, especially the poorest one, will not be able to use or contribute to development of major drugs and the costs of new pharmaceuticals are bound to increase beyond their reach. Indian pharmaceutical industry can play an important role in this scenario.

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