ISSUES IN MEDICINE

Preventing disease and saving lives: The malaria season is upon us

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The burden of malaria

In South Africa, malaria is endemic in three provinces – Limpopo, Mpumalanga and KwaZulu-Natal (Fig. 1) – and transmission occurs predominantly between September and May.[1] Over the past decade, the National Department of Health (DoH) has focused intense efforts on preventing the local transmission of malaria, and on ensuring the prompt and effective management of cases, especially in the endemic provinces. The DoH has recorded significant success in reducing the burden of malaria through the implementation of its key interventions: Vector Control, Case Management, Surveillance, Health Promotion, and Epidemic Preparedness and Response. Notified malaria cases in the aforementioned provinces have decreased by 88% over the past decade, from 64 622 cases in 2000 to 7 626 in 2010. In the same period, malaria-related deaths have been reduced by 81%, from 458 to 87 deaths.[2]

Malaria has been a notifiable disease in South Africa since 1956 (Government notice No. 2 081 of 1956). One of the key challenges that the DoH has historically faced is the irregularity of routine notifications, particularly from the private sector and public health facilities in non-endemic areas. In recent years, reporting appears to be gaining in efficiency, with an increase in malaria notifications from the non-endemic areas, especially Gauteng (Fig. 2). In this province, trends for malaria cases and related deaths show an increase over the past 2 years, with a peak in January. This seasonality is related to travellers returning from malaria-endemic areas, particularly Mozambique (Fig. 3).[3]

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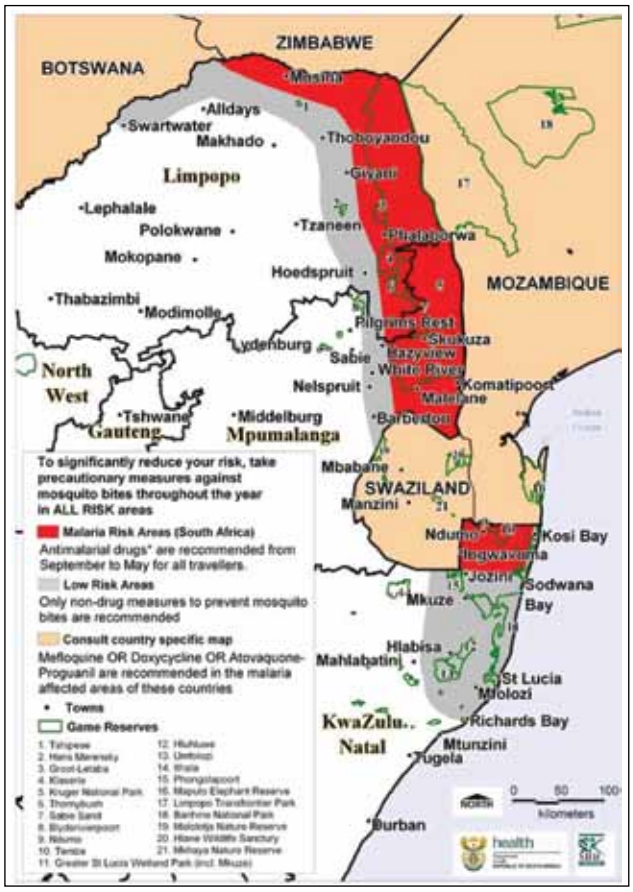


Fig. 1. Malaria risk in South Africa.

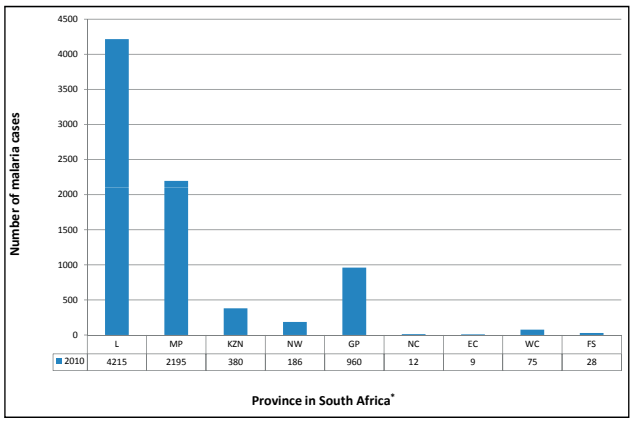
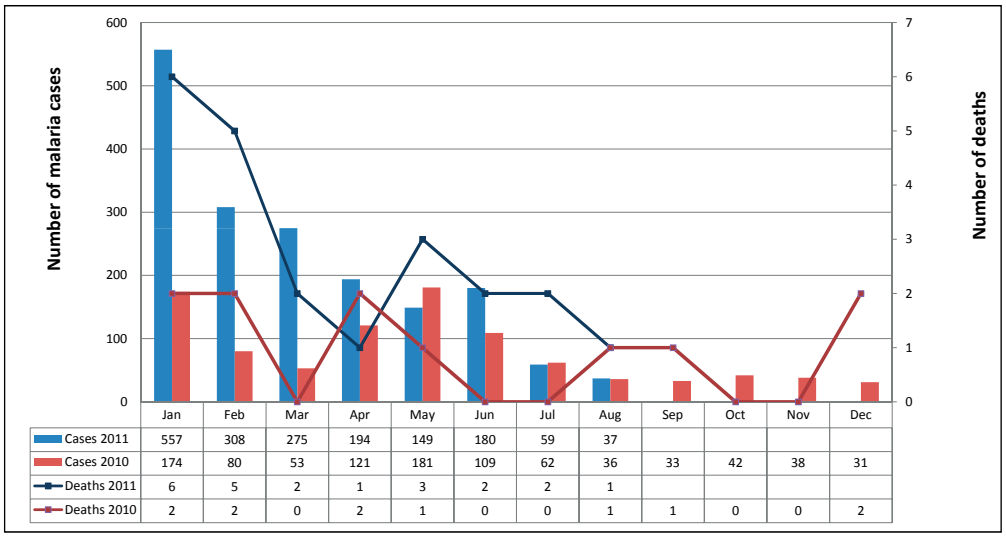


Fig. 2. Malaria notifications for South Africa in 2010. Provinces: L – Limpopo; MP – Mpumalanga; KZN – KwaZulu-Natal; NW – North West; GP – Gauteng; NC – Northern Cape; EC – Eastern Cape; WC – Western Cape; FS – Free State.

Malaria prevention and control strategies are being implemented robustly in the endemic provinces; however, similar strategies in the non-endemic provinces are lagging behind. This paper provides



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Cases 2011	557	308	275	194	149	180	59	37				
Cases 2010	174	80	53	121	181	109	62	36	33	42	38	31
Deaths 2011	6	5	2	1	3	2	2	1				
Deaths 2010	2	2	0	2	1	0	0	1	1	0	0	2

Fig. 3. Malaria cases and deaths in Gauteng Province in 2010 and 2011.

Fig. 4. Clinical and laboratory features of uncomplicated and severe malaria.

advice on the key measures for malaria prevention and management. Successful malaria treatment is dependent on a high index of suspicion for malaria in patients with acute febrile illness, and urgent treatment with effective medication.

Prevention of malaria

Travellers to malaria areas in southern Africa will be particularly vulnerable as the malaria risk season peaks in the coming months; therefore emphasis should be placed on prevention. Measures to avoid mosquito bites are the mainstay of malaria prevention and should be emphasised at all times. Whether or not appropriate chemoprophylaxis is warranted, should be determined by weighing up the risk of contracting malaria against the risk of adverse effects. Malaria risk is determined by travel location and accommodation, as well as season and length of stay. For example, the risk in built-up cities during the dry winter months is significantly less than that at a river-side campsite in summer. Malaria-transmitting mosquitoes feed at night; therefore people should ideally remain indoors from dusk until dawn, in rooms that have screens on the windows and doors.

The only insect repellents that are recommended are those containing diethyl toluamide (DEET).[4] Products containing 30% DEET should be used for adults and children older than 2 months, as they give longer protection. They should, however, only be applied to exposed skin, particularly in young children. There is no benefit from using products containing more than 50% DEET.[5]

If the risk of contracting malaria warrants more protection than mosquito avoidance, chemoprophylaxis should be advised. There are 3 effective options available in South Africa; all require a doctor's prescription; therefore travellers should prepare for their travel timeously:

- Mefloquine (weekly): start at least 1 week before entering a malaria area, take weekly while there and for 4 weeks after leaving the malaria area
- Doxycycline (daily): start 1 - 2 days before entering a malaria area, take daily while there and for 4 weeks after exiting the malaria area
- Atovaquone-proguanil (daily): start 1 - 2 days before entering the malaria area, take daily while there and for 7 days after leaving the area.[1]

All 3 medicines are effective if taken correctly and if compliance is assured.[1] The chemoprophylaxis selection depends on the duration of visit, affordability, age, whether the person is pregnant or breastfeeding, has any medical conditions (e.g. epilepsy or depression), or is taking any other medication. Certain activities, such as flying or scuba diving, also need to be taken into account when choosing prophylaxis. The majority of adverse effects are mild; any severe adverse effects should be reported to the healthcare worker immediately, and the chemoprophylaxis changed if needed.

There is no scientific evidence that natural or homoeopathic products are effective against malaria; therefore their use should be avoided in the prevention of this potentially life-threatening illness.[6]

Diagnosis and management of malaria

Successful malaria treatment is dependent on a high index of suspicion for malaria in patients with acute febrile illness, as well as urgent treatment with effective medicines. *Plasmodium falciparum*

Key issues to note

Malaria is mainly transmitted from September to May in South Africa. Travellers should be informed about the preventive measures to be taken when travelling to endemic areas in and around the country. For more information, refer to the World Health Organization's risk areas for malaria: http://www.who.int/entity/ith/chapters/ith2011chap7.pdf. [11]

Key malaria preventive measures:

- avoidance of mosquito bites should form the basis of prevention
- effective chemoprophylaxis requires the most appropriate of the 3 recommended options for the individual concerned to be selected and to be taken correctly and for the full course; lack of adherence will lead to prophylactic failure.

Natural or homeopathic products should not be used for malaria prevention as they have not been shown scientifically to be effective.

Considerations for malaria diagnosis and management:

- almost all South Africans (including residents of seasonal malaria transmission areas) are non-immune, and are consequently at increased risk for developing severe malaria
- the diagnosis and management of malaria is urgent: delayed diagnosis and inappropriate treatment are associated with significantly increased morbidity and mortality
- an initial negative test result does not exclude the diagnosis of malaria: repeat testing is mandatory in patients with continued symptoms and no alternative definitive diagnosis
- a high index of suspicion for malaria in patients with acute febrile illness, and urgent treatment with an effective medicine, is crucial to successful treatment.

Further guidance is available through National Guidelines for the Prevention/Treatment of Malaria (http://www.doh.gov.za/docs/policy/2011/malaria_prevention.pdf and http://www.doh.gov.za/docs/policy/2011/malaria_treatment.pdf), the Amayeza Information Centre (telephone: +27 (0)11 678 2332) and the UCT Medicines Information Centre (telephone: +27 (0)861 100 531).

accounts for the majority of malaria cases in Southern Africa, and causes almost all severe and fatal instances of the disease. South Africans, including residents of seasonal malaria transmission areas, are non-immune and are consequently at increased risk for developing severe malaria.

The diagnosis and management of malaria is urgent; delayed diagnosis and inappropriate treatment are associated with significantly increased morbidity and mortality.[7] Classically, malaria presents with fever, rigors, headache and myalgia (Fig. 4), but the clinical features are nonspecific and may be confused with many other diseases, especially influenza. A definitive diagnosis should be made promptly by detection of the parasite with microscopic examination of a blood smear, or with the use of a rapid malaria antigen test. An initial negative test does not exclude the diagnosis of malaria, and repeat testing is mandatory in patients with continued symptoms and no alternative definitive diagnosis. All patients with malaria require careful clinical and parasitological follow-up.

For uncomplicated malaria, artemether-lumefantrine (Coartem) is recommended for first-line therapy. Alternatively, quinine plus either doxycycline or clindamycin can be used, if artemether-lumefantrine is unavailable or contra-indicated. High-level resistance precludes the use of chloroquine and sulfadoxine-pyrimethamine (SP) for *P. falciparum* malaria; halofantrine is not recommended.[8]

The major complications of malaria include: cerebral malaria, hypoglycaemia, anaemia, renal failure, acute respiratory distress syndrome (ARDS) and metabolic acidosis (Fig. 4). These carry high mortality rates, especially in children, pregnant women and those with HIV/AIDS. These complications indicate the need for urgent hospital admission, and require specific management.

For patients with severe malaria, intravenous artesunate is the preferred treatment; extensive studies in adults and children in Africa and Asia have shown that artesunate drastically reduces in-hospital mortality.[9,10] Artesunate is not yet registered in South Africa, but is available in sentinel hospitals for the treatment of infected adults and children through the Parenteral Artesunate Access Programme. Where artesunate is not available, parenteral quinine is recommended, with an initial loading dose, and should be combined with doxycycline or clindamycin.

Despite being a preventable and readily treatable disease, malaria continues to cause thousands of cases in South Africa each year, with a high risk of life-threatening disease, if diagnosis is delayed or ineffective treatment is given.

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