

## Malaria morbidity and mortality in Uganda

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Malaria is the leading cause of morbidity and mortality in Uganda especially in children under five years. Transmission of malaria is perennial though there are seasonal exacerbations. Up to 70 per cent of outpatient cases and over 50 per cent of inpatient admissions in the under fives are malaria cases. It is responsible for a specific death rate among this age group of 37/1000 and 18/1000 live births in high and low malaria endemic areas respectively or a total of 70,000–110,000 child health deaths annually. It is also the major killer of refugees and internally displaced people in Uganda. Malaria cases increased from 1,444,352 in 1995 to 2,923,620 in 1999.

There is considerable malaria morbidity due to repeated low level and mostly non-febrile infections with the parasites resulting into chronic anaemia in children and pregnant women particularly primigravidae. Severe malarial anaemia is responsible for a case fatality rate of 8–25 per cent among paediatric admissions. It is responsible for nearly 60 per cent abortions or miscarriages. High levels of resistance to classical malaria drugs have resulted in increased malaria morbidity.

### Background

The republic of Uganda is situated in East Africa and lies between latitude 4012'N and 1029'S and longi-

tude 29034' and 3500'E. It is bordered by Kenya in the east, Tanzania in the south, Sudan in the north, Democratic Republic of Congo in the west and Rwanda in the southwest. The country occupies a total area of 241,038 sq km out of which 82% is land. It is a tropical country receiving rain throughout the year but with two dry seasons (December–February and June–August).

### Salient demographic data

The population of Uganda currently stands at 24.6 million (September 2002 census), however, data reported in this report is based on population estimates projected from the 1991 census of whom about four million were children below five years. The maternal mortality rate in Uganda is one of the highest in the Sub-Saharan region (Table 1).

Malaria is the major cause of morbidity and mortality in Uganda especially in children below five years (Fig. 1) with a high (25 per cent) frequency. The major causes of mortality in the age group are characterised in most cases by underlying malnutrition. Many of the children who die from malaria also have malarial anaemia.

Malaria has historically been a very serious health

**Table 1. Salient population demographic data**

Parameter	1991	1995	2000
Infant mortality rate per 1,000 live births	122	81	88
Mortality rate of U5 per 1,000 live births	180	147	152
Maternal mortality ratio per 1,00,000 live births	700	506	504
Total fertility rate per woman	7.1	6.96	6.9
Literacy >15 years (%)	54	62	74

U5—Under five years of age; NB: HIV/AIDS, malaria and anaemia contribute to infant and maternal mortality; Source : Uganda Ministry of Health (Unpublished data).

problem and currently poses the most significant threat to the health of the people of Uganda (Uganda Ministry of Health—Unpublished data). Studies done in some hospitals like Mbarara University Teaching Hospital and Bundibugyo Government Hospital in Western Uganda show that more than 55 per cent of paediatric cases are due to malaria<sup>1,2</sup>. Malaria currently accounts for:

- 25% of all outpatients visits at the health facilities.
- 20% of hospital admissions.
- 9.14% of inpatients deaths.
- a case-fatality rate of 35% (which is an under estimate, since many malaria cases go unreported especially those in areas inaccessible to health facilities).

- 23 and 11% of deaths among the under fives in high and medium malaria transmission areas respectively (estimates by Uganda Ministry of Health).
- Severe malarial anaemia is responsible for a case fatality rate of 8–25% among paediatric admissions<sup>1,2</sup>.
- Nearly 60% of miscarriages or abortions in the country<sup>3</sup>.

Malaria morbidity is high in the country because of perennial transmission. Highland areas like in Eastern and Western Uganda which had unstable malaria before 1997 now report high malaria morbidity as a result of increased rainfall due to El Nino Southern oscillation effects. These areas have experienced malaria epidemics in the last four years. Some studies<sup>4,5</sup> have shown positive correlation between rainfall anomaly and vector density one month later. In highland population in Uganda, epidemic malaria appears to occur at extremely low inoculation rates. In addition to this, there is increased resistance to classical malarial drugs.

### Causes of malaria in Uganda

The most common malaria parasite is *Plasmodium falciparum*. The malaria vectors in Uganda are *Anopheles gambiae sl* and *An. funestus* both of which are indoor feeders.

Falciparum malaria is the major cause of anaemia in pregnancy especially in primigravidae. Some studies

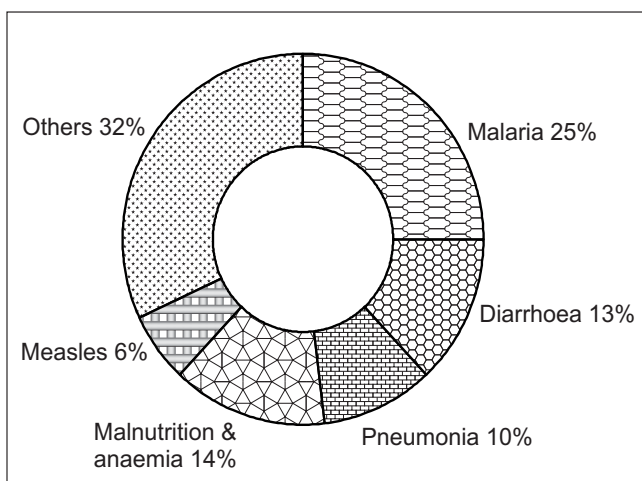


Fig. 1: Causes of U5 mortality in Uganda

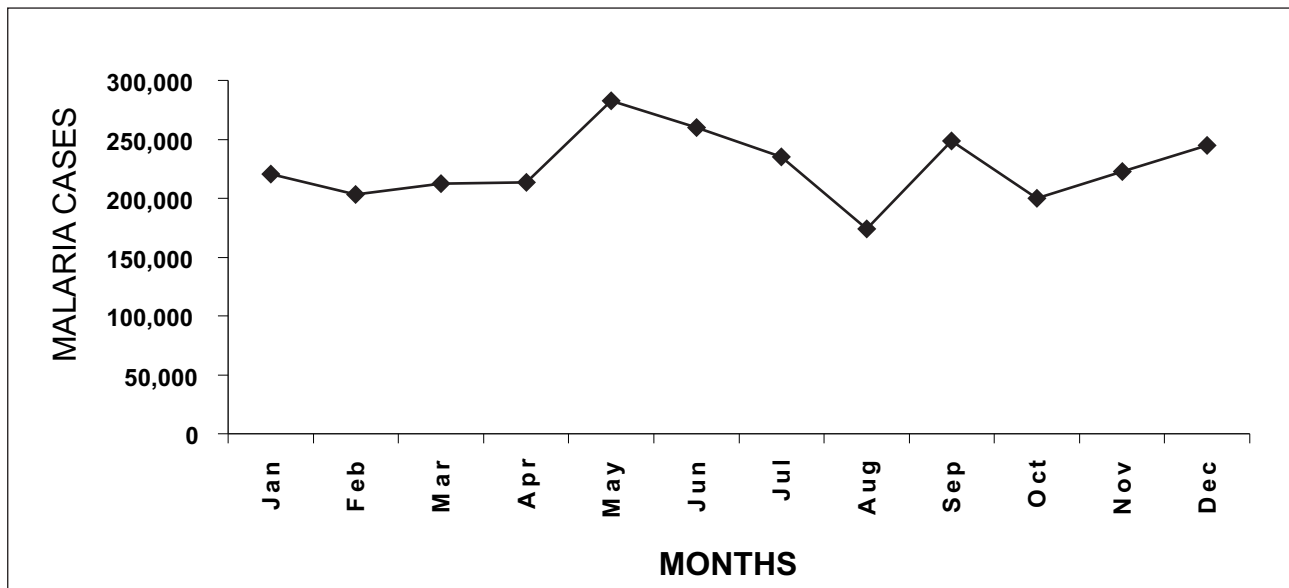


Fig. 2: Malaria incidence in Uganda in 1999

have shown prevalence of more than 80 per cent of primigravidae with severe anaemia having malaria parasites in their blood<sup>3</sup>. In one of such studies malaria hyper reactive splenomegaly seen in pregnant women was also associated with high parasite density ( $p = 0.01$ ) and low haemoglobin ( $p < 0.0001$ )<sup>3</sup>.

Malaria transmission is increasing in Uganda due to massive deforestation and cultivation of wetlands, poor environment sanitation or other man-made breeding sites like construction works, brick pits or fish ponds. In the last two years more than five dams have been constructed in Mbarara district in Western Uganda. Global warming in association with wetland reclamation may have contributed to the changes in malaria epidemiology in the highlands of southwest Uganda resulting in malaria epidemics in recent years. Such affected area is Kabale district, which in the 1950s was declared malaria free by WHO but in 1999 the reported malaria cases in the district reached epidemic values of 109,092 cases<sup>1</sup>. The district lies between  $1^{\circ} 5' - 1^{\circ} 30' S$ ,  $29^{\circ} 45' - 30^{\circ} 15' E$  at an altitude of 1500–2400 m. Annual rainfall is 850–1200 mm and temperatures 10–25°C are fairly constant throughout the year. The area has unstable malaria. In 1998 there were increased hospital

admissions in Kabale Government Hospital due to prolonged El Nino rains in 1997. There were more stillbirths in the hospital than in those regions of stable malaria. Highland populations like Kabale, and Mbale in Eastern Uganda experienced epidemic malaria which occurred at extremely low inoculation rates resulting in serious morbidity and mortality<sup>4</sup>.

In 1995 the reported malaria cases, countrywide, were 1,444,352 cases compared to 2,923,620 in 1999 (Fig. 2) showing a double increase in malaria cases in four years. Importantly, the figures were from government hospitals and health centres in 42 of the 45 districts at that time. Three districts had not submitted their reports at the time of compilation of the health ministry report. Twenty-five of the 42 districts with reported malaria cases had incomplete records. Lack of up to-date proper records imply low figures of reported cases.

There is increased treatment failure with chloroquine in children under five years of age. In 2000 the Uganda Ministry of Health changed chloroquine as first-line treatment. Currently, a combination of chloroquine and sulfadoxine-pyrimethamine (SP) is the first choice treatment. It is estimated that 35 per cent of patients

with malaria are resistant to chloroquine and 10 per cent are resistant to SP.

### Conclusion

It is estimated that the overall cost for malaria may be as high as one per cent of the gross domestic product. More to this, between 33 and 54 per cent of absenteeism either at work or at school is attributable to malaria. Thus, malaria may not only be the leading cause of ill health and death in Uganda but also the leading cause of poverty in the country. There is need to improve management of malaria cases, laboratory diagnostic capabilities, community awareness capacity of early detection of epidemics, data surveillance and reporting for the control of the disease.

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