

Special joint report

RATES

18%

Statistics. Uganda's malaria prevalence rate, the highest in Africa, alongside Mozambique, according to the 2016 World Malaria Report. In East Africa, Uganda rules the malaria roost, followed by Kenya at 14 per cent, Tanzania at 11 per cent, and Rwanda at eight per cent.

PREVALENCE. While recent studies indicate prevalence is on the decline, the deaths associated with it are not abating. Globally, there were 212 million new cases of malaria in 2015, and the African region accounted for about 90 per cent of these cases, followed by south-east Asia at seven per cent and the eastern Mediterranean region at two per cent.

How treated bed net solved East Africa's malaria puzzle

Netting malaria. After years of drug failures and growing resistance to insecticides, the war on malaria, a killer disease, is being won from the comfort of the bed, write **Emmanuel Ainebyoona in Kampala, Syriacus Buguzi in Dar es Salaam and Aggrey Omboki in Nairobi**

On the beaches of Zanzibar, where the waters of the Indian Ocean kiss sandy landings all day and night, malaria is on the way out, almost eliminated through years of research, sensitisation, and vector control via, primarily, the bed net.

On the shores of Lake Kyoga in Uganda, where waters of the Victoria Nile reach for the shallow depths on their way from Lake Victoria to Lake Albert, the mosquito is at its best ferocity, sinking its labrum into one's body as many as 1,500 times a year... if one does not have a bed net.

And in the highlands of Kenya, where dewy tea plantations stretch under the watchful majesty of Mt Kenya, the mosquito is slowly carving a habitat, aided by climate change, its own ability to adapt, and, you guessed it right, low use of bed nets.

These are the contrasting experiences of East Africa's war on malaria, a disease long regarded as one of the region's most dangerous. While recent studies indicate prevalence is on the decline, the deaths associated with it are not abating. Globally, there were 212 million new cases of malaria in 2015, and the African region accounted for about 90 per cent of these cases, followed by south-east Asia at seven per cent and the eastern Mediterranean region, at two per cent.

For East Africa, as the opening paragraphs above indicate, the war against the disease has yielded a

bag of mixed fortunes. Where it has succeeded, the bed net has always been the uncelebrated hero.

In Kenya, where prevalence is at around eight per cent, and where the disease killed at least 16,000 people last year, the journey towards manageable levels of infection is fraught with challenges despite considerable resource allocation in terms of finance, medicine, and personnel.

The National Malaria Strategy of 2001/10 puts emphasis on scaling up distribution of insecticide-treated nets, improving access to effective medicines for treatment, and epidemic preparedness.

A large-scale bed net trial at Kilifi in the coast, covering 53,000 people, marked the beginning of the country's efforts to provide treated bed nets to its people, with a subsequent Unicef campaign targeting 700,000 others in 35 districts in 2001, a further five million nets being distributed through ante-natal clinic in 2006, and 3.4 million nets being given out in 2006.

Across the border in Tanzania, 10 to 12 million people contract the disease every year, according to the National Malaria Control Programme. About 80,000 of these never survive, many of them being children under the age of five and pregnant women. The net, again, is at the centre of the battle.

And in Uganda, despite the national prevalence declining from 42 per cent in 2009 to 19 per cent in 2015,

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Success. Number of mosquito nets distributed to Ugandan households in 2013 where malaria is endemic throughout the country. In Kenya, a large-scale bed net trial at Kilifi in the coast, covering 53,000 people, marked the beginning of the country's efforts to provide treated bed nets to its people, with a subsequent Unicef campaign targeting 700,000 others in 35 districts in 2001, a further five million nets being distributed through ante-natal clinic in 2006, and 3.4 million nets being given out in 2006.

the disease remains the number one cause of illness and death. Because the mosquito seems to be clawing back — latest data from the country's annual health sector performance report indicates that the number of malaria cases per 1,000 persons increased to 433 in the Financial Year 2016/17, from 408 in 2015/16, way above the Health Sector Development Plan target of 329 per 1,000 — the government is, you guessed it right, again, ramping up the supply of treated bed nets.

While a recent research by Kemri-Wellcome Trust found that sub-Saharan Africa has experienced a decline in the prevalence of the *P. falciparum* malaria parasite — from 40 per cent prevalence in children aged two to 10 years between 1900 and 1929, to 24 per cent in the same age group between 2010 and 2015 — scientists and medical experts are worried by the possibility of resurgence in the wake of growing resistance to medication, as well as climate change-induced outbreaks.

More than 50 people died in Kenya early October of the disease, which infected 2,000 others. Authorities blamed the outbreak on rain, saying it had created fertile breeding grounds for vector mosquitoes.

In Tanzania, the threat remains huge as more than 93 per cent of the population lives in malaria-endemic zones.

Prevalence has risen from nine per cent in 2011/12 to 14 per cent in 2015/16, according to the Tanzania Demographic and Health Survey and Malaria Indicator Survey (TDHS-MIS) for the period 2015/2016.

Infection is highest in children from Geita, Kigoma and Kagera regions, and almost zero in Arusha, Njombe, Iringa, Dodoma, Kilimanjaro, and the Manyara regions of the mainland, and in all the regions of Zanzibar.

The battle is relying heavily on insecticide-treated nets; whose use among children under the age of five has increased substantially in recent years, from only 16 per cent in 2004/05 to a high of 72 per cent in 2011/12, before declining to 54 per



cent in 2015/16. Dr Amos Kahwa of the National Institute for Medical Research says that bed net coverage in Tanzania is still facing challenges, hence "more research is still needed, especially on how to better increase the coverage without relying on free distribution."

There are people, says Dr Kahwa, who use the free nets for fishing, even though the minister for Health, Community Development, Gender, Elderly and Children, Ms Ummu Mwalimu, believes the government has to keep budgeting for the service.

The national action plan for control of malaria on mainland Tanzania focuses on sustaining the gains made so far in controlling the disease, and also exploring the possibilities of moving towards the malaria pre-elimination phase by 2020 and the World Health Organisation's target of eliminating the disease by 2030.

Dr Frederick Haraka, a clinical epidemiologist and a research scientist from the Ifakara Health Institute, says Tanzania's goal to eliminate malaria will also depend on how much investment the country will put in vaccine development.

He, however, cautions that the malaria vaccine "will not replace other preventive measures such as insecticide-treated nets, spraying indoor walls with insecticides, and preventive medicine for pregnant women, under-fives and infants".

"These should rather complement the proven approaches towards achieving the 2030 malaria elimination goal," he suggests.

In Uganda, funding and sensitisation drives have resulted in lower prevalence rates — as low as one per cent in the capital — even though malaria remains the top cause of morbidity among all ages,



Services. Women and children at Lalogi Health Centre IV outpatient department wait for malaria testing and treatment recently.
PHOTO BY STEPHEN OKELLO



Observation. "Uganda is not only the Pearl of Africa for humans, but also for mosquitoes. Little wonder, then, that we boast the highest mosquito biting rates recorded in the world." *DR DAMIAN RUTAZAANA, EPIDEMIOLOGIST*



ZANZIBAR SUCCESS STORY

Can any East African nation ever be malaria-free? Yes, it is possible, and to see why you need not look further than Zanzibar, where prevalence rates have been kept at below one per cent since 2013. The island's Malaria Elimination Plan aims at consolidating malaria control achievements toward pre-elimination by the year 2018 through multiple interventions, including raising awareness, use of treated mosquito nets, proper diagnosis, and residual spray. Through its malaria elimination programme dubbed Zamep, Zanzibar has been struggling to meet its goal of zero locally acquired malaria cases on the island by the end of this year.

with more males affected, at 516 cases per 1,000 compared to 354 among females.

Dr Damian Rutazaana, a malaria epidemiologist with the National Malaria Control Programme (NMCP), blames the high infection rates on the habitat.

"Uganda is not only the Pearl of Africa for humans, but also for mosquitoes," he says. "Little wonder, then, that we boast the highest mosquito biting rates recorded in the world," he adds.

The country's Apac District — located near the swampy areas of Lake Kyoga — has the dubious reputation of being home to the highest number of malaria-infected mosquito bites per person annually in the world, at a whopping 1,564.

The 2016 World Malaria Report confirms Dr Rutazaana's assertions by indicating that Uganda and Mozambique have the highest malaria cases in Africa, standing at 18 per cent.

In East Africa, Uganda rules the malaria roost, followed by Kenya at 14

per cent, Tanzania at 11 per cent, and Rwanda at eight per cent.

A 2013 epidemiological profile of malaria by the NMCP and Malaria Public Health Department University of Oxford-Kenya Medical Research Institute indicates that transmission of the disease is perennial, which poses a big challenge to the reduction and eventual elimination efforts by Kampala.

Dr Rutazaana says malaria cases in Uganda are normally at the peak two times a year, after the rainy seasons of June-July and November-December. Transmission is generally hyper-holoendemic, where some areas record high transmissions whereas others have low infections.

Uganda records about 16 million cases of malaria and 6,000 deaths due to the disease annually. Malaria is endemic in the whole country, even though highland areas such as Kabale, Ruwenzori and Mbale have low prevalence.

The Uganda Malaria Indicator Survey of 2014/15 indicates the country's malaria prevalence has dropped from

Intervention. Mr Peter Amanyire, the officer-in-charge of Kasenda Health Centre III, responds to a resident, who wanted to know how to use mosquito insecticide-treated nets, recently in Rwakenzi Village, Kabarole District.

PHOTO BY ALEX AHABA

42 per cent in 2009 to 19 per cent in children of 0-59 months. The Ministry of Health attributes the sharp fall to government interventions, including scaling up of treatment services, distribution of insecticide-treated mosquito nets, and, like Kenya and Tanzania, indoor residual spraying in some households.

Uganda's Health minister Dr Jane Aceng says the prevalence rates have further dropped, with Kampala, the capital city, registering the lowest prevalence countrywide, at one per cent.

Dr Jimmy Opigo, the NMCP manager at the Ministry of Health, says infection rates can further be prevented by stricter vector control, chemoprevention (providing drugs that suppress infection) or, potentially, by vaccination.

Currently, 90 per cent of the households in Uganda own at least one mosquito net, compared with 47 per cent in 2009.

The percentage of children who slept under an insecticide-treated net before the night of the survey

increased from 33 to 74 per cent, while for pregnant women it increased from 44 to 75 per cent.

However, Dr Rutazaana says over the years, there has been increasing resistance to insecticides, especially pyrethroids, across the East African region.

The Uganda programme is therefore piloting the use of nets with an added compound, called Piperonyl Butoxide, to help address this challenge.

Such resistance has been recorded in Kenya, where the biggest gains have also come via the mosquito net, as captured in the Kenya Malaria Indicator Survey (KMIS) of 2015, which shows that 29 per cent of the total population slept under a long-lasting insecticidal net in 2010, with bed net coverage increasing to 48 per cent in 2015.

Health Cabinet Secretary Cleopa Mailu says implementation of evidence-based targeted interventions has scaled down the overall prevalence rate to eight per cent, down from 11 per cent in 2010.

Indoor residual spraying of households, which targeted 1.2 million families between 2007 and 2010, suffered a setback in 2009 due to the downward adjustment of Global Fund allocations, reaching only 35 per cent of targeted households.

Future efforts to fight malaria hold bright prospects for the country, as Kenya is among three African countries chosen in April by the World Health Organisation to test the world's first malaria vaccine. Ghana, Kenya and Malawi will begin piloting the injectable vaccine next year among young children, who have been at highest risk of death.

HISTORY OF MALARIA IN AFRICA SINCE 1900

1900-1945: The dark days: After years of ravaging the continent, one of the biggest historical drops in malaria followed the Second World War in the 1940s with the discovery of Dichlorodiphenyltrichloroethane (DDT) and chloroquine.

1950-1980: Era of chloroquine: Malaria prevalence was low during the late 1960s, through the 1970s and early 1980s. This was a period when, despite low investment in malaria control in Africa, chloroquine use was widespread

with repeated dosing available to the general population. Together with drought across the Sahel, this produced a lull in malaria transmission.

1980-1990: Rainfall raises risk: Chloroquine resistance expanded across Africa in the 1980s, and in the late 1990s unprecedented rainfall led to flooding and major malaria epidemics. Ministries of Health across the continent woke up to the perfect storm without any significant mosquito vector control in place. Malaria prevalence, which had returned to the levels seen before the Second World War.

1990-2015: Enter the bed net: The financial response by the Global Fund and the technical revisions to policy by the World Health Organisation after 2005 led to one of the largest drops in malaria infection prevalence witnessed since 1900. This saw the rolling out of insecticide-treated bed nets and new drugs to treat malaria. Between 2010 and 2015 the decline in malaria prevalence has stalled.