

The Jojoo Mosquito Repellent Soap

*'Africa's innovative solution
to Malaria prevention'*



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MALARIA - A GLOBAL HEALTH PROBLEM

Epidemiology of Malaria

According to the World Malaria report, there were about 216 million cases of malaria and an estimated 655,000 deaths in 2010. Most deaths occur among children living in Africa where a child dies every minute from malaria.

Malaria is a severe health problem in many of the warm temperate climates. The Centre for Disease Control (CDC) believes there are 300-500 million cases of Malaria every year and more than 1 million people die from it.

In many parts of the world, primarily Africa and Asia, mosquitoes that carry malaria have developed high resistance to insecticides. In addition, the parasites have developed resistance to some antibiotics. These conditions have led to difficulty in controlling both the rate of infection and the spread of this disease.

The history of malaria stretches from its prehistoric origin as a zoonotic disease in the primates of Africa through to the 21st century. A widespread and potentially lethal human infectious disease, at its peak malaria infested every continent, except Antarctica. Its prevention and treatment have been targeted in science and medicine for hundreds of years. Since the discovery of the parasites that cause malaria, research has been focused on their biology, as well as that of the mosquitoes which transmit the parasites.

In 2013, 97 countries had ongoing malaria transmission. An estimated 3.4 billion people are at risk of malaria of which 1.2 billion are at high risk. In these areas, more than one malaria case occurs per 1,000 population.

There were an estimated 207 million cases of malaria in 2012 (uncertainty range: 135 – 287 million) and an estimated 627,000 deaths (uncertainty range: 473,000 – 789,000). 90% of all malaria deaths occur in sub-Saharan Africa.

In 2012, malaria killed an estimated 482,000 children under five years of age. That is 1,300 children every day or one child almost every minute.

At the close of the 20th century, malaria remained endemic in more than 100 countries throughout the tropical and subtropical zones including large areas



of Central and South America, Haiti and the Dominican Republic, Africa, the Middle East, the Indian subcontinent, Southeast Asia and Oceania.

The discovery of the zoonotic species of the parasite, have complicated control measures which had been implemented. The Plasmodium has become resistant to anti-malaria drugs, as well as mosquitoes to insecticides.

Similarly Dengue fever also known as break bone fever, is a mosquito-borne tropical disease caused by the dengue virus. It's symptoms are similar to malaria which include fever, headache, muscle and joint pains but also shows a characteristic skin rash that is similar to measles. In a small proportion of cases the disease develops into the life-threatening Dengue hemorrhagic fever, resulting in bleeding, low levels of blood platelets and blood plasma leakage, or into Dengue shock syndrome, where dangerously low blood pressure occurs.

Dengue virus is primarily transmitted by the Aedes mosquitoes which typically bite during the day, particularly in the early morning and in the evening thus able to spread infection at any time of day all during the year.

Dengue is common in more than 110 countries. It infects 50 to 528 million people worldwide a year, leading to half a million hospitalization and approximately 25,000 deaths. For the decade of the 2000s, 12 countries in Southeast Asia were estimated to have about 3 million infections and 6,000 deaths annually. It is reported in at least 22 countries in Africa but is likely present in all of them with 20% of the population considered to be at risk.

Rates of Dengue increased 30 fold between 1960 and 2010. This increase is believed to be due to a combination of urbanization, population growth, increased international travel, and warming. The geographical distribution is around the equator. An infection with Dengue is second only to malaria as a diagnosed cause of fever among travelers returning from the developing world. The World Health Organization (WHO) counts Dengue as one of seventeen neglected tropical diseases.

As there is no commercially available vaccine for Dengue, prevention is sought by reducing the habitat and or the number of mosquitoes and limiting ones exposure to mosquito bites.

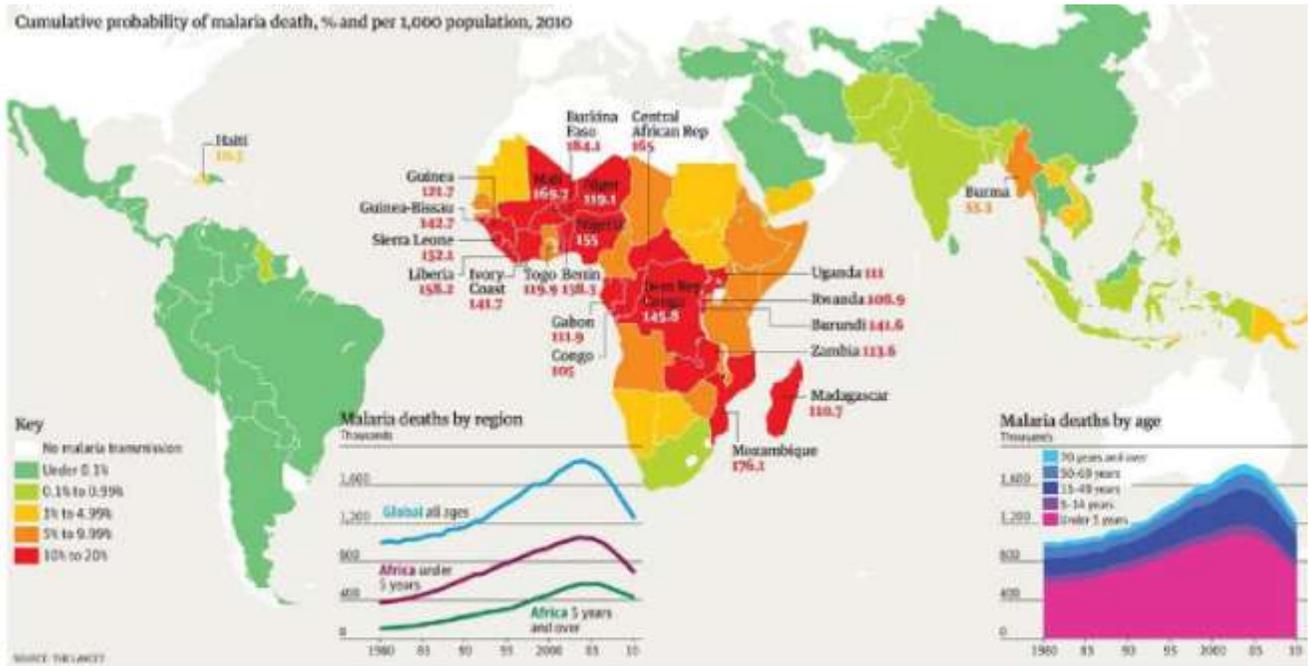
The most critical factors in the spread or eradication of these diseases have been human behavior and living standards. Precise statistics do not exist because many cases occur in rural areas where people do not have access to hospitals or other health care facilities and as a result, the majority of cases



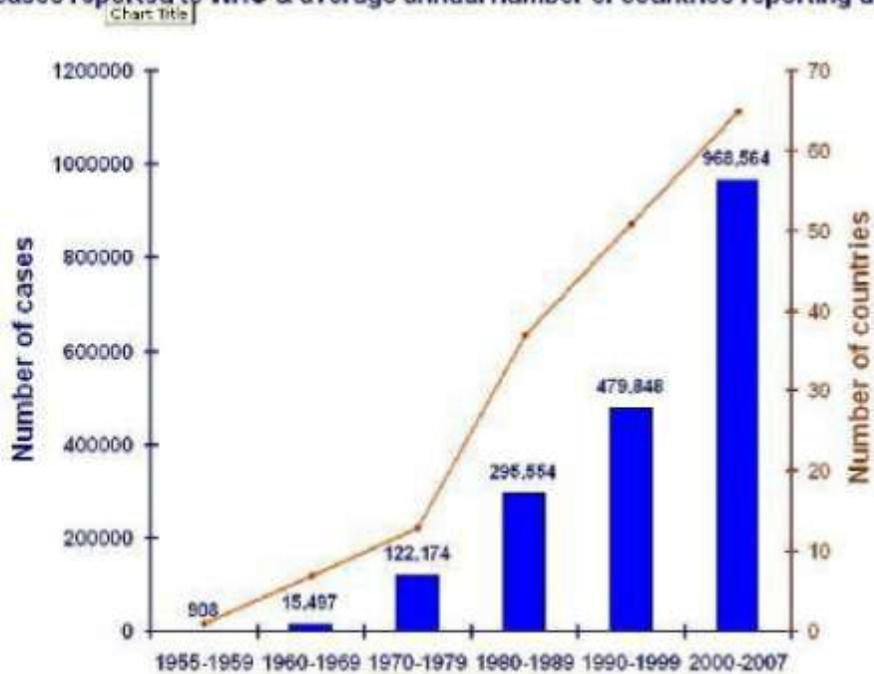
are not reported thus undocumented. Poverty though has been and still remains associated with the diseases.

However both diseases are entirely preventable and treatable mosquito borne illnesses.

Data on Malaria and Dengue extracted from the World Health Organization.



Average annual number of DF/DHF cases reported to WHO & average annual number of countries reporting dengue





The Current Solutions

For many years Insecticides have played a major role in malaria prevention by killing mosquitoes. This unfortunately has not been enough as with time the mosquitoes became resistant. Similarly, mosquito nets were used and recently there was the introduction of treated nets. Millions of people still don't have access to these products due to poverty and or cultural practices. Statistics also showed that the mosquito changed their habits of biting during the night to now being day time thus spreading other diseases such as Dengue.

Traditional herbal remedies have been used to treat malaria. The first effective treatment for malaria came from the bark of cinchona tree, which contains quinine. After the link to mosquitoes and their parasites were identified in the early twentieth century, mosquito control measures such as widespread use of DDT, swamp drainage; covering or oiling the surface of open water sources, indoor residual spraying and use of insecticide treated nets was initiated. Prophylactic quinine was prescribed in malaria endemic areas with new therapeutic drugs including chloroquin and artemisinin used to resist the scourge.

Between 2000 and 2012, the scale-up of interventions helped to reduce malaria incidence rates by 25% globally, and by 31% in the WHO African Region.

The global malaria mortality rate was reduced by 42% during the same period, while the decrease in the WHO African Region was 49%. Between 2000 and 2012, a scale-up of malaria interventions saved an estimated 3.3 million lives. 90%, or 3 million, of these are in the under-five age group in sub-Saharan Africa.

52 countries are on track to reduce their malaria case incidence rates by 75%, in line with World Health Assembly and Roll Back Malaria targets for 2015. These 52 countries only account for 4% (8 million) of the total estimated malaria cases. 59 countries are on track to meet the Millennium Development Goal target of reversing the incidence of malaria (between 2000 and 2015). International targets for reducing malaria cases and deaths will not be attained unless considerable progress is made in the 18 most affected countries, which account for an estimated 80% of malaria cases. About 40% of malaria deaths occur in just two countries: Nigeria and the Democratic Republic of the Congo.



Trends in the scale-up of Malaria Interventions

In 2013, an estimated 136 million long-lasting insecticidal nets (LLINs) were delivered to endemic countries, a major increase over the 70 million bed nets that were delivered in 2012. About 200 million LLINs have been funded for delivery in 2014, suggesting an even stronger pipeline for 2014.

Population access to LLINs remains below the target of universal coverage and has not appreciably improved over the last two years because of the low numbers of LLINs delivered in 2011 and 2012.

In 2012, 135 million people (4% of the global population at risk of malaria) were protected by indoor residual spraying worldwide.

The expansion of access to rapid diagnostic tests (RDTs) and quality-assured artemisinin-based combination therapies (ACTs) has been increasing.

The volume of RDT sales to the public and private sectors of endemic countries has increased from 88 million in 2010 to 205 million in 2012. Between 2010 and 2012, the proportion of suspected malaria cases receiving a diagnostic test in the public sector increased from 44% to 64% globally, and from 37% to 61% in Africa.

The number of patients tested by microscopic examination increased to 188 million in 2012, with India accounting for over 120 million slide examinations. In 2012, 331 million ACT courses were procured by the public and private sectors in endemic countries – up from 278 million in 2011, and just 11 million in 2005. ACTs are recommended as the first-line treatment for malaria caused by *Plasmodium falciparum*, the most deadly *Plasmodium* species that infects humans.



Our Solution:

“THE JOJOO MOSQUITO REPELLENT SOAP”



Our Solution is an innovative, simple mosquito repellent soap made from natural essential oils. The JOJOO Mosquito Repellent Soap is made from the active ingredient of Citronella oil which is proven to be gentle on the skin while repelling mosquitoes at the same time.

The JOJOO Mosquito Repellent soap's active ingredient is Citronella oil, extracted from lemongrass. The

United States Environmental Protection Agency (US EPA) considers oil of Citronella as a bio pesticide with a non-toxic mode of action. The US EPA states that Citronella oil has little or no toxicity when used as a topical insect repellent, with no reports of adverse effects of concern over a 60 year period.

The International Centre of Insect Physiology and Ecology (ICIPE) tested the JOJOO Mosquito repellent soap under **WHO** standards, and proven the soap to be effective for over 8 hours. This provides sufficient protection to users during the day and night.

Our Vision

Our aim is to partner with NGOs and Public Policy makers to aid us in distributing the soap as widely as possible in Africa.

This is not only to help fight mosquito transmitted diseases, but also educate people on sanitation and that prevention is better than cure!

Partner with us in reducing mosquito transmitted diseases.





International Centre of Insect Physiology and Ecology

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TEST REPORT

This report is not to be used for any litigation. This report is not to be used for any litigation.

Test report No. SOP/RA-373/06-14

July 3, 2014

Samples Received From: Sapphire Trading Company Limited,
P.O.Box 45938, 00100
Nairobi – Kenya

Sample Details: One sample of formulated Soap marked " Soap-01614" as Repellent for repellency studies

Action Requested: Evaluate and assess if the formulated products repel adult mosquitoes for up to eight hours. These data were required by the Kenya Bureau of Standards as a registration condition

Repellent Lab Trial Results:

Time	Repellency (%)	Remarks
Mean CPT ± sd (95% CI)	8.9 ± 2.0 h. (8.5 – 11.4 h)	These results support the hypothesis that the products repel mosquitoes for up to 8 hours.
Kaplan-Meier Median CPT	9.1 h	
Time to 25% failure	8.1 h	
Mean LIBes per subject	2.4	

Conditions at: Temp: 26-27 °C, RH: 65-70%

Tested as per: WHO/HTM/NTD/WHOPES/2009.4

Tested by: RO

Verified by: JB

Conclusions: The data collected from this experiment show that Soap-01614 provided a CPT of 8.5 hours against mosquitoes under laboratory testing conditions.

Recommendations: Results shows that the product repelled mosquitoes for more than eight hours. Other studies of suitability for use on human skin can be conducted or if already done to be attached to this report

Tested by / Head Laboratory services

Leader, Applied Bioprospecting Programme



As FAO Reference Centre and a Stockholm Convention Regional Centre





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