Mali Malaria Outbreak - 2021

Disease Detective Division

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Introduction

In response to the newly reported Malaria outbreak in a rural village in Mali, Africa we have compiled a report about the outbreak and the preventive measures we will put in force to halt the outbreak.

Malaria is a parasitic infection caused by a bite from an infected mosquito, normally the female Anopheles mosquitoes[1]. Malaria can be treated with antimalarials though it is quite costly. Malaria is mainly caught at night or dusk when the female Anopheles mosquitoes are most active. Malaria has similar symptoms to flu. If you catch malaria from the P. falciparum parasite (one of the five species of malaria causing parasites that is mainly found in Africa) it can progress to severe illness and death within 24 hours of symptoms beginning meaning it is vital to get treated immediately.[7]

Africa has 95% of all malaria cases and 96% of malaria deaths.[7] Africa is hit by malaria far harder than any other continent in the world due to the fact the strain of malaria (P. falciparum) found there is the most deadly. It is also hit hard due to the fact it isn't as developed and has high levels of poverty meaning it is difficult to obtain antimalarials and insecticide treated nets.

Importance of Preventing Further Spread

Because of the expenses of treating malaria and the fatality of the infection, stopping the outbreak spreading further is of utmost importance.

Unicef has reported that ‘every two minutes, a child under five dies of malaria. Many of these deaths are preventable and treatable. In 2019, there were 229 million malaria cases globally that led to 409,000 deaths. Of these deaths, 67 per cent (274,000) were children under 5 years of age. This translates into a daily toll of nearly 750 children under age 5.’[4]

It is not just lives that are being lost from the spread of Malaria, there are also financial implications from the costs of treatment and preventative measures like nets. While people are infected with Malaria they are unable to work driving them further into poverty and making it even harder to get treatment.

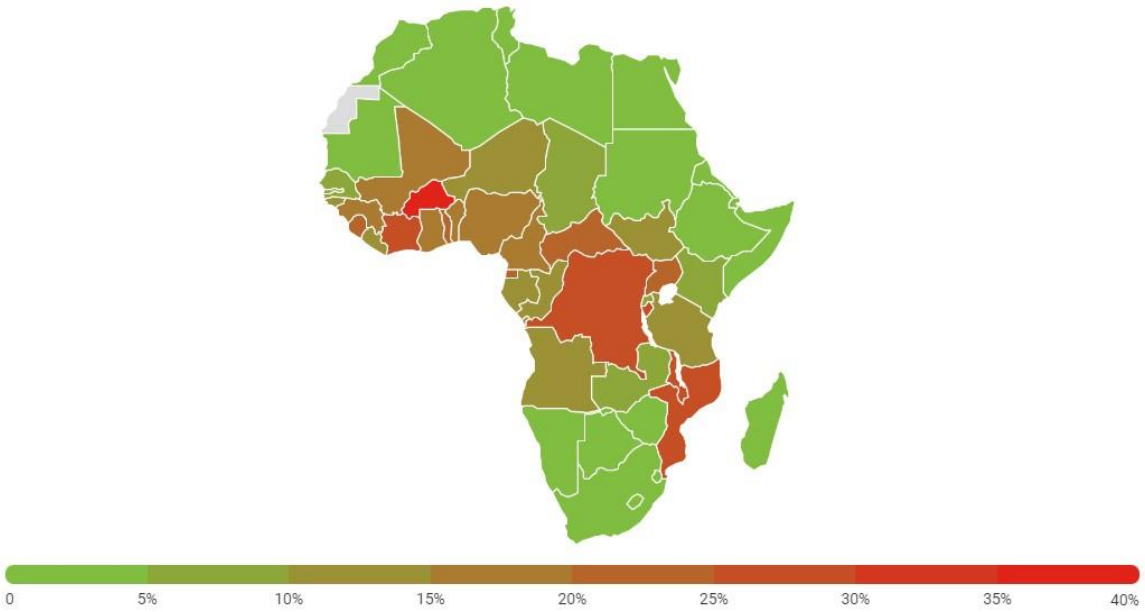
‘The cost of malaria can be measured in lives lost, in time spent ill with fever, and in economic terms.’[5] At a personal level there are lots of costs involved for example: Money spent on treating malaria; Lost wages; Cost of Insecticide treated nets; Time away from school. Malaria also costs governments because they have to spend a lot of the health sector budget on the treatment and prevention of malaria. There is also a sizeable national cost as the growth of the economy and scientific breakthroughs are hindered by the price of treatments. ‘All of these effects are recognized and accepted widely, but their magnitude has been poorly documented.’[5] All of this means that Malaria outbreaks can cause serious economic crises and can completely disrupt the government/council of the area.

The quicker malaria is treated the less it will be transmitted further because uninfected mosquitoes drinking the blood of an infected human means they now transmit the parasite.

Difficulties in Stopping Malaria

Malaria, being a parasitic infection, is difficult to protect against using a vaccine. Vaccines normally work by injecting a weakened form of the disease so your immune system recognises it if you were ever to become exposed to the disease again, malaria is a parasitic infection that has a completely different method of duplicating and only relies on the host for nutrients meaning that it is harder for the immune system to recognise and fend of the illness. Malaria, having similar symptoms to flu as mentioned in the Introduction, can be misdiagnosed in travellers causing wrong medication to be prescribed and it doesn't get treated which can lead to death.

Percentage of deaths caused by malaria in children under 5 years of age in Africa (2000-2017)



Mali has 18% of the deaths in children under 5.[5] Mali is next to Burkina Faso which is the country most affected by Malaria even with its small landmass. This means that part of the reason why there is a malaria outbreak in Mali may be because it has spread from Burkina Faso

Temporary measures like insecticide covered nets would need to be distributed in mass to prevent bites in the night. Due to Mali being quite remote and isolated shipping products in and getting a supply of insecticide will be difficult.

Mosquitoes, which are the method of transmission for Malaria, are incredibly common in places such as rural Africa. It is hard to completely isolate yourself from mosquitoes because of this meaning staying away from mosquitoes is not a viable option.

As mosquitoes can fly they are harder to catch. Some mosquitoes can travel up to 64km[2] and the Anopheles mosquitoes can travel several kilometres[3]. Mosquitoes also fly in large groups meaning eliminating a swarm of mosquitoes is quite difficult.

Strategies

As a temporary solution as mentioned above we will be mass shipping nets and insecticides to prevent immediate spread of malaria. With 85% of Mali's households having at least one ITN (Insecticide treated net)[4] not too many nets will need to be shipped. We will also be shipping large amounts of insecticide for residual spraying to kill mosquitoes that are living in or near a house.[7]

'Diagnostic testing enables health providers to swiftly distinguish between malarial and non-malarial fevers, facilitating appropriate treatment.' Distributing these diagnostic testing kits to surrounding areas will allow us to identify if the Malaria outbreak has spread further than just the originating village in Mali or if the origin of the outbreak is actually somewhere else for example from Burkina Faso.

As a more permanent solution we will be demonstrating how to make nets suitable for holding mosquitoes back so people can continue to manufacture nets going into the future. This will also provide some well needed jobs for the community further helping with the economic problems communities that had malaria outbreaks face.

We will distribute the RTS,S/AS01 vaccine to prevent cases developing. The vaccine will cut down on the amount of money spent on antimalarials as it would prevent the parasite from infecting you in the first place. The vaccine was recently approved and moved into production in October of this year.[6] As this is a poorer community, we will be providing this vaccine for free and educating people on the benefits of the vaccine. Even though it only prevents 4 in 10 cases that still reduces the amount of antimalarials taken significantly.

There are additional considerations when implementing a vaccine program in a rural area. There may be a lack of access to transport to more urban areas so a mobile vaccination unit will be necessary. This would enable people to get a vaccine who wouldn't have been able to travel to the nearest town. Educating people on the benefits of a vaccine will increase the uptake and make people more comfortable with having it.

Unfortunately 'a dormant stage... can persist in the liver (if untreated) and cause relapses by invading the bloodstream weeks, or even years later.' This means giving the vaccine to people who have already caught malaria, and survived, will provide immunity against any possible relapses.[8]

We will also be importing anti-malarials to treat anyone who currently has the disease to prevent further deaths from this epidemic. This will also help with the monetary costs that come from Malaria as it means residents of Mali will not have to pay for expensive medication later on and don't have to miss as long off jobs.[6]

At WHO, we have recently found antimalarial drug resistance which could be a threat in the future if malaria was to become resistant to our treatment methods. If this drug-resistant malaria was to spread to more places on the globe this could cause a hard to treat outbreak. The vaccine should protect against drug-resistant malaria so if you get vaccinated you should be protected against malaria epidemics, drug-resistant or not.[7]

Conclusion

In conclusion, although vast improvements have been made through the development of a malaria vaccine earlier this year we will still need to act quickly with all parts of our strategy to avoid more drug-resistant malaria strands developing and make sure everyone gets vaccinated at the same time to avoid the vaccine wearing off before everyone is protected. Using insecticide at the same time across Africa will prevent mosquitoes from reproducing before more insecticide is used allowing the number of them to be reduced significantly.

Historically, Africa has suffered terribly from the hardships of malaria for example the economic crises and devastating personal losses. Hopefully with a cohesive strategy we can lift this burden. We can learn from this outbreak in Mali to prevent further outbreaks going forward and save lives lost.

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