



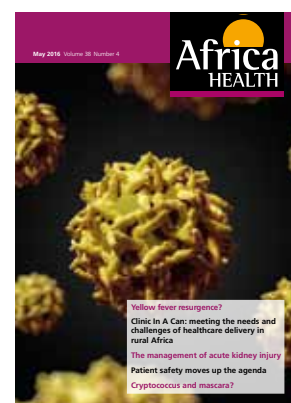
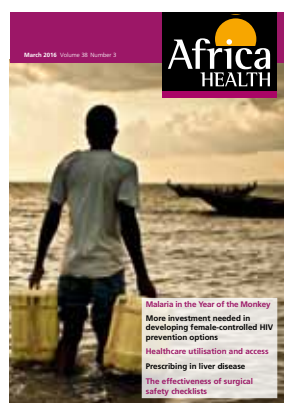
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Magnetic filter offers the potential of treating malaria without drugs

Red blood cells infected with malaria parasites become magnetic. Initial results are promising from an ingenious blood cleansing process using a filter and magnets



British entrepreneur Dr. George Frodsham is developing a groundbreaking drug-free malaria treatment

Somewhere in Africa, a child dies of malaria every minute. The disease is one of the world's most deadly and, too often, those infected arrive at hospital either too late to be saved or with untreatable strains of the disease.

Last year, there were 214 million cases of malaria worldwide. It killed 438 000 people.

According to the World Health Organization (WHO), Africa bears the brunt of the global burden of malaria. In 2015, 88% of all cases and 90% of all the deaths it caused globally occurred in the WHO African Region.¹

Within Africa, some of the worst affected countries are Nigeria, Ghana, Uganda, Democratic Republic of Congo, and Tanzania. And, as well as human life, malaria exacts a significant financial and social toll at both individual and national level.

According to Centres for Disease Control and Prevention, the direct costs (illness, treatment, premature death, etc) are estimated to be at least US\$12 billion per year. However, the cost in lost economic growth is many times more than that.²

Some patients arrive at hospital too late for treat-

ment to be effective. Their illness escalates and becomes severe, drastically reducing their chances of survival. Mortality in these cases can be as high as 20%. Severely affected patients are treated with intravenous drugs and stay in hospital for an average of four to five days. They are, by a long way, the most expensive patients to treat. Furthermore, many of them are children, pregnant women and travellers, so are among the most vulnerable people in society.

The situation is serious enough. However, scientists are increasingly concerned about drug resistant strains of malaria. Today, three of the five strains of the disease that affect humans can resist antimalarials—and they're spreading.

With this in mind, MediSieve is developing a groundbreaking drug-free malaria treatment. They have invented the MediSieve Filter, a magnetic sieve that physically removes malaria-infected blood cells directly from a patient's bloodstream.

Red blood cells infected with a malaria parasite have magnetic properties. This enables the MediSieve Filter to capture them without affecting healthy cells. The

process is similar to dialysis in that a patient's blood is continuously circulated through a magnetic filter device via an external blood loop. Red blood cells infected with the malaria parasite are captured in the filter. The healthy blood returns to the patient unharmed.

Initial trials show that the MediSieve Filter could extract up to 90% of infected cells from a person with malaria in under four hours. Treatment with the device involves no drugs or chemicals, but is intended as a complement to existing medicines. By reducing a patient's infection burden much faster than with drugs alone, it can turn back the clock for patients, eliminating symptoms faster, and improving chances of survival. Not only could this save lives, it could also help patients recover faster, reduce the need for aggressive, expensive intravenous drugs, and get patients and their families back to work or school sooner.

This means the MediSieve Filter could provide economic benefits to both healthcare systems and patients, as well as health benefits. Children and pregnant women are among the groups who could benefit most from treatment with the MediSieve Filter.

The device could also help patients manage malaria and keep symptoms at bay indefinitely, which would be a particularly welcome development for people with drug-resistant malaria.

References

1. <http://www.afro.who.int/en/malaria.html>
2. http://www.cdc.gov/malaria/malaria_worldwide/impact.html

Dr. Frodsham founded MediSieve in 2015 with £350 000 in seed funding from angel investors.

The company went on to receive a Pathfinder Award from the Wellcome Trust worth £102 000 to fund a 12-month project to develop clinical prototypes of its device. This was supplemented in January 2016 by an Innovate UK Smart Proof of Concept Award worth £100 000 to enable the pre-clinical testing of the device in preparation for clinical trials, currently planned for 2017.

In March 2016, MediSieve took the runner-up spot at Pitch@Palace 5.0, a twice-yearly UK event where entrepreneurs pitch their businesses to an audience of around 300 CEOs, angel investors, mentors, and key business partners. This brought in additional business mentoring to help MediSieve develop its product.

A physicist and engineer with a PhD in biochemical engineering from University College London (UCL), Dr. Frodsham was awarded a BBSRC Enterprise Fellowship from the Royal Society of Edinburgh in 2014.

About MediSieve

Dr. Frodsham is a member of the Royal Academy of Engineering Enterprise Hub and was a runner-up in its ERA Foundation Entrepreneur's Award, 2015.

In April 2016, Dr. Frodsham spoke at the Royal Society of Medicine's 12th Medical Innovations Summit. The event saw the launch of Doctors of the Future, a new online news and current affairs style programme created jointly by the Royal Society of Medicine and ITN Productions.

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