

MALARIA

- *developing an affordable ultrasonic device to fight the global health scourge*

Facts & Statistics

Malaria is one of the most severe public health problems worldwide. It is a leading cause of death and disease in many developing countries, where young children and pregnant women are the groups most affected. According to the World Health Organization's World Malaria Report and the Global Malaria Action Plan:

- 3.3 billion people (about half the world's population) live in areas at risk of malaria transmission in 106 countries and territories.
- In 2015, there were roughly 212 million malaria cases and an estimated 429 000 malaria deaths.
- Emerging drug resistance is a growing concern.

Malaria & the Sustainable Development Goals (SDGs)

Achieving the end of malaria will have a reverberating impact on most of the critical conditions that curtail the welfare of the world's poorest people. Winning the fight against malaria will contribute significantly to achieving five of the SDGs, making it imperative that efforts at malaria control be stepped up if we are to achieve the SDGs before time runs out:

- **Eradicate extreme poverty, zero hunger & economic growth (SDG 1, 2 & 8):** Controlling malaria will help to eradicate extreme poverty because falling sick keeps people poor, costing countries in affected regions billions per year in lost GDP and consuming up to 25% of household incomes.
- **Good health & well-being (SDG 3):** Malaria is a leading cause of child mortality in the affected regions, accounting for as much as 20% of all deaths. Malaria infection during pregnancy is also a major cause of premature birth and infant mortality. Malaria is four times more likely to strike pregnant women than other adults and is also particularly damaging to pregnant women. Malaria control will reduce morbidity and mortality due not only to malaria but also to other diseases such as HIV
- **Quality education (SDG 4):** Malaria hampers efforts to achieve universal quality education. As a leading cause of illness and absenteeism in children and teachers, malaria impairs attendance and learning and can cause lasting neurological and cognitive damage in children.

Current Remedies

- **Drugs** – a variety of Artesunate Combination Therapy drugs are currently been used for the treatment of Malaria. But at \$5 for a complete dose, these are “expensive” for families that live on less than \$1 per day. This is growing concern about drug resistance.
- **Mosquito nets** – these have been very effective in reducing infection in the location where they have been embraced. They however prevent mosquito bites only when the user is in bed; users are exposed to bites between dusk and the time they go to bed. Night time temperatures of over 30 degrees centigrade are not uncommon in the affected regions, and there is a strong temptation for users who do not have electric

fans or air conditioners to simply fold them up in order to get some reprieve from the heat.

- **Indoor residual spraying (IRS)** – is also effective in reducing the incidence of the disease, as it kills the mosquito that find their way indoor. They are however expensive and there are health concerns regarding its use, coupled with the fact that it only offers protection indoors.
- **Vaccine** – this is been developed, and promising results are been achieved. Clinical use is however 5 or more year away from now, and the vaccine does not protect from the unpleasant bite and irritating noise that the mosquito makes.

Proposed Solution

The development of an affordable ultrasonic device that will kill or incapacitate mosquito within a certain radius of where it is placed. This will address the disadvantages noted above concerning the current remedies. There are a number of current uses and several ongoing research on ultrasonic devices - http://en.wikipedia.org/wiki/Sonic_weapon

Approach

A multidisciplinary team comprising researchers in the Physics, Engineering, Biology and other related departments of a leading university working together to develop a prototype with research grants from bodies like the Gates Foundation and other international agencies that fund Malaria research.

Four Nobel prizes have been awarded in the past for work associated with malaria - Sir Ronald Ross (1902), Charles Louis Alphonse Laveran (1907), Julius Wagner-Jauregg (1927), and Paul Hermann Muller (1948). The successful development of this suggested solution could win yet another one!

Yes, we can!!!

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