Text to Accompany Malaria No More Presentation

Malaria as New Model for Disease Eradication

There are no half measures. We’re all in to end malaria.

Malaria is the world’s oldest deadliest disease, killed more people than any other cause: war, famine, any other disease. Bill gates calls it “the worst thing on the planet”. It is easy to see why, when we began 1.2 million deaths a year, a child every 30 seconds.

Makes the progress over the last dozen years all the more remarkable: 7 million lives saved, >60% decline in cases.

In 2015, we worked with Ray and Bill Gates to develop a plan to eradicate malaria within a generation. It is the first ever business plan to end a disease.

That plan inspired the Economist magazine to put a dead mosquito on its cover, and state that malaria eradication **“WOULD RANK AMONG HUMANITY’S GREATEST achievements”**

**Save 10 million lives, prevent 4 billion cases, unlock $2 trillion in economic benefits.**

For the first time 46 countries, half of malaria affected world, reports fewer than 10k cases. Within striking distance of elimination. 10 by end of 2020.

How do we get from here to there? It will require a new model of disease elimination.

As everyone here knows, the only human disease eradicated is smallpox. We’re close with Polio. Within striking distance of a few others.

The common denominator is that these are viruses, addressed with a silver bullet, a vaccine.

A parasite a more complex adversary. For the first time we have a partially effective vaccine, but only works in about half of people.

There is a complex interaction between three organisms: Parasite, Mosquito, and Man.

Malaria thrives on misinformation. Even the name malaria is a misnomer… it is Italian word that means “Bad Air”.

It wasn’t until 1897 that Dr. Ronald Ross a British born physician and polymath living in India discovered that the mosquito was the true vector for the disease.

Bad information is the reason that a child still dies every 2 minutes. Good information is how we’re going to end this disease.

The good news is an information revolution. Africa has leapfrogged the powerline and the PC. Gone directly to mobile. An estimated 1 billion mobile phones by end of 2015.

When you look at the information challenges we have to solve, mobile is at the center of the solution again and again.

EXAMPLES

From Diagnostics to Data

Prior to 2010, there was no practical way for most people to get a timely, accurate diagnosis.

* Had to travel many KM to a clinic with an expensive microscope, a trained lab technician, and then hope that they got it right.
* Around that time began to use an RDT – a $.50 device that tells you in a matter of minutes with 99% accuracy if you have the malaria parasite.
* There are now more than 250m used annually globally.
* What is an RDT but a + or -, a 1 or 0, a bit of data. This data is revolutionizing how we fight this disease.
* One of the most profound changes is that it’s putting state of the art diagnostics in the hand of front line health workers, which is allowing for the effective diagnosis of malaria.
* Equally Important what is NOT MALARIA. In Senegal, in 2010, PECADOM, turned into PECADOM ++ as they dealt with pneumonia, diarrhea, upper respiratory infection.
* In 2017, at a Malaria No More event, we announced a new ultra-sensitive test (collaboration between Alere/Abbott, Path and the Gats Foundation)
* test for malaria that is 10 times as powerful as current tests.
* Sensitive as low as 10 parasites/ml.
* It is revolutionizing our ability to accurately identify people who are carrying the malaria parasite.
* In honor of our friends from India, we will keep this focused on India.
* For those of you who have studied the history of global health know that India is the proving ground for humanity’s ambition to end diseases, the place where our strategies and ambitions are tested.
* Smallpox was the first – and to date only – human disease to ever be eradicated, and it had its stiffest test in India in the 1970s. “eradication from India was the crucial step, for smallpox was especially stubborn and virulent there,” writes Dr. Larry Brilliant
* Short story is that their efforts stalled because they were failing to inoculate mobile populations, adult males.
* One of the best examples comes from Orissa, in India. We’re joined at the conference by Honorable Director of Health Services of Orissa, Dr. Pattnaik.
* In 2015, India committed to eliminate malaria by 2030. Between 2016 and 2017, India reduced malaria cases by 24% and was the only country among the 11-highest burden countries to mark progress, according to the [WHO World Malaria Report 2018](https://www.who.int/malaria/publications/world-malaria-report-2018/en/%22%20%5Ct%20%22_blank).
* This success was driven largely by Odisha, which has seen greater than 80% decline in cases and deaths in a single year.
* How did they do it? Through a simple, yet ingenious intervention using diagnostics.
* DAMAN – Treating malaria in remote settings. Monsoons had always been the biggest barrier…
* Interestingly, almost 70% of the positive cases they found were in asymptomatic patients. If you imagine malaria as an iceberg, finally finding and treating the mass that is hidden from view.
* MNM is working with the Government of Orissa to analyze and optimize document and disseminate this program and encourage adoption across India.
* **Subnational optimization of interventions is transformative**Data-based optimization of current & new tools, with subnational tailoring of targeted and optimized packages, can greatly increase impact across transmission spectrum.

Second Revolution: Human Mobility -

* The same challenge exists in malaria. Mosquitoes live their entire lives within a 1kmx1km box. It’s people that move around and transmit the vector.
* Only by understanding human mobility can we truly identify the choke points for the disease.
* Traditionally, this was done using traffic patterns on major highways and in train depots. But with the advent of the cell phone, we have an novel, incredibly precise way to track human mobility.
* By registering calls through nearest cell phone tower you can see where a phone is located, when it moves, how long it stays, and when it comes back.
* Fantastic example comes from Kenya, where Caroline Buckee, of the Harvard School of Public Health, worked with Kenya’s largest mobile operator, Safaricom, to analyze call records from 15 million consumers. When combined with regional malaria incidence patterns, the data revealed a few key insights.
* First, that most of the malaria emanated from the high-transmission areas along Lake Victoria along Kenya’s west coast.
* No big surprise there. But the data also spotlighted unusually high migration from the Lake Zone region inland, to a town called Kericho.
* A few clicks of a Google map reveal a massive and bustling tea plantation that was serving as a kind of bus depot for malaria. Infected workers came from the Lake Zone, where mosquitoes picked up the parasite and infected their co-workers in Kericho, who in turn transported the parasite inland to their home communities.
* Through the work of people like Professor Andy Tatem at Southampton University, seeing this done on a regional scale.
* Same thinking gone into work in Southern Africa. When you overlay detailed parasite positivity maps with human mobility, you get parasite mobility maps.
* Southern Africa, where eight countries have committed to eliminate malaria in the next few years.
* **Importation wins against high intervention coverage -** Human mobility is high enough in Sub-Saharan Africa that MDA campaigns with 80%+ coverage across a region will not clear enough of the asymptomatic reservoir to prevent transmission and eliminate
* This analysis shows us that unless you can shut down malaria in southern Mozambique, you cannot hope to stop importation of malaria in nearby countries.
* Orissa and mobility – pumping into other parts.

3rd Revolution: Genomic approaches

* Building on point of care diagnosis and human mobility is a bold new frontier of Genetic epidemiology.
* Molecular surveillance as a tool. To provide near real time tracking of transmission chains for ebola or influenza.
* Dr. Vivek Singh, one of the organizers of this conference, talked about his work in Bihar India. Were able to use genetic sequencing from sewage samples n Mumbai to determine which state had originated the polio cases.
* Some additional complexity doing for malaria parasite.
* Genetic measures of parasite relatedness can provide estimates of connectivity between parasite populations. Combined with human mobility powerful.
* In low transmission settings, identify origins of imported parasites, quantify onward transmission, length of transmission chains etc.
* Also vital in understanding the spread of drug resistant strains of the parasite.
* But to do this at scale requires routine generation of parasite genetic data.
* Still at early stages, but ambitious projects have begun. Over 4000 P. f genomes have been sequenced from different transmission settings through projects like Pf3k Project.