Malaria is at the heart of the misery and economic devastation in Africa. Every year hundreds of millions of people are infected with malaria, and more than one million of them – mostly poor African children – die from it. Malaria also takes an economic toll, costing billions of dollars annually in lost productivity and diverted resources.

Until recently, the world’s wealthier countries paid little attention to this problem. Could it be because in places like Europe and the United States, malaria was defeated long ago? For most people in the developed world, malaria is viewed as a historical artifact. Thankfully, today, the international community is beginning to share a conviction that it’s time to do for Africa and other malaria endemic regions what was done in rich countries long ago: make malaria history.

If this effort is to succeed, it must avoid a critical but easy mistake. It is tempting to assume we have what we need to defeat malaria globally. We do possess powerful interventions – insecticide treated bed nets, indoor insecticide applications and combination malaria drugs – but we need new ways to implement them and, ultimately, we will need more tools. History teaches us that what works today may not be effective in the future and that a long-term solution requires continuous innovation.

While the world is finally focusing on malaria, it is vital to implement a global strategy that invests aggressively in malaria’s short and longer-term challenges. This must include strong support for long-neglected research and development (R&D) in medicines, vaccines, mosquito control, and new methods for implementing these interventions.

Innovative Solutions for an Innovative Adversary

The global community must maximize its use of available tools. Every child under the age of five and every pregnant woman in malaria endemic areas should have an insecticide-treated net under which to sleep. Everyone with malaria should receive treatment with effective drugs. Where indoor residual spraying is effective, it should be implemented. These solutions will save lives now and catalyze a virtuous economic cycle that can help pull communities out of poverty.

But we know these tools will not always work. Both the parasite and the mosquito that transmits it have been incredibly innovative in the face of assault. As old as humanity itself, malaria was first described in ancient Chinese medical writings in 2700 BC. Historians speculate that it contributed to the fall of the Roman Empire. Its tenacity is the reason malaria is still with us today.

Over the last 50 years, the parasite has become resistant to widely-used drugs, including two inexpensive and reliable medications, chloroquine and sulfadoxine/pyrimethamine, that had effectively treated the disease for decades. Mosquitoes also develop resistance to insecticides.

As tools for fighting malaria are weakened or rendered useless, there must be alternatives ready to replace them, and the only way to be prepared for this future is to invest in research now. For example, today’s strategies that delay the onset of resistance by using multiple drugs targeting different aspects of the parasite are the result of years of research.

A History of Neglect

One of the reasons we face a malaria crisis today is because decades of neglect of malaria R&D have limited both the number of effective tools available and strategies for using them. Indeed, if malaria vaccines, affordable antimalarial drugs and innovative insecticide applications were widely available in malaria endemic areas, we would not be in a situation where 3,000 children die of malaria every day.

Over 90 percent of health research resources are spent on diseases that affect just ten percent of the world’s population. Even the current surge of interest in malaria has not led to anywhere near sufficient investment. For example, at the US National Institutes of Health (NIH), and the US Department of Defense, which for decades have been at the forefront of malaria research, underfunding of malaria programs is slowing progress. Global underfunding is occurring when quantum leaps in our understanding of basic biology and the mechanisms of disease are producing breakthroughs throughout the field of biomedical research. Advances also are occurring in malaria research, but scientists could move much faster if the support they received was more in line with the magnitude of the challenge they confront.
Searching for What Was the ‘Holy Grail’, Discovering ‘OZ’, Decoding Malaria DNA

Recent success in the quest for a malaria vaccine and new malaria medicines offers evidence of how greater investment in R&D can put us one step ahead of the disease by providing new tools that are safe, effective and, equally important, well-suited for the less-developed countries where they are most needed.

A vaccine often has been described as the "Holy Grail" of malaria prevention. Aggressive efforts by dozens of research groups around the world provided evidence that a malaria vaccine is possible. Now, results from a large clinical trial conducted in Mozambique have shown that a malaria vaccine can provide children in Africa with significant protection against malaria. This trial, a collaboration supported by the PATH Malaria Vaccine Initiative with funding from the Bill & Melinda Gates Foundation, is one of several recent advances changing the dynamics of malaria vaccine development.

Another example of innovation aiding the fight against malaria is the advent of what may be a powerful new drug. An international public-private collaboration led and supported by the Medicines for Malaria Venture has developed an inexpensive synthetic compound, known by its abbreviated name "OZ," that appears to be effective at fighting even the malaria strains that are resistant to other malaria drugs. It is currently being tested on malaria patients. If the clinical performance is as good as the activity in the test tube, OZ could be a breakthrough in antimalarial drug development.

Meanwhile, an international consortium of scientists supported by NIH, the Wellcome Trust, the World Health Organization’s Special Programme for Research and Training in Tropical Disease (WHO/TDR) and other distinguished research institutions has generated a wealth of information by providing the sequence to the genomes of the deadly malaria parasite *Plasmodium falciparum* and its mosquito vector, *Anopheles gambiae*. This knowledge is driving the discovery of the genes at work in malaria infection and transmission and has the potential to produce a multitude of new targets for attacking the disease.

In addition, research by TDR and others continues to be instrumental in getting better results from existing tools by finding new methods for providing early treatment, distributing medicines and insecticide-treated bednets, and preventing malaria in infants.

A Strategy to Avoid the Tragedy of Temporary Success

If, in a mere six years, partnerships between private philanthropy, NGOs, pharmaceutical companies, university researchers and government scientists can achieve unprecedented progress toward new malaria interventions, imagine what wider and greater commitment could bring. For starters, it could greatly accelerate progress on vaccines, new drugs, new diagnostics, new insecticides and innovative delivery approaches. It could strengthen efforts, such as those undertaken by the Multilateral Initiative on Malaria and the Gates Malaria Partnership, to involve more African scientists and research institutions in the fight against malaria.

More broadly, it would support multifaceted, collaborative research endeavors that would focus on all aspects of the malaria crisis. It would allow scientists worldwide to seek out innovations to ensure that malaria is brought under control and stays under control. It would be an unspeakable tragedy to make great progress against malaria only to see that progress erased due to our failure to anticipate new challenges and invest in finding ways to respond to them.

If we commit to immediate action to deploy existing tools in tandem with the pursuit of necessary innovation, then there is every reason to believe that we are on the verge of a world in which children worldwide will encounter malaria the same way a European or American child does: not via a mosquito bite but through a history book.

Malaria R&D Alliance is an alliance of malaria research and development organizations jointly advocating for global commitment for increased and sustained resources for malaria R&D. Goals of the alliance are to raise awareness about malaria and the critical need for R&D to combat the disease. The Alliance’s working group includes Multilateral Initiative on Malaria [MIM], Medicines for Malaria Venture [MMV], PATH Malaria Vaccine Initiative [MVI], Malaria Foundation International [MFI], Gates Malaria Partnership [GMP] and Special Programme for Research and Training in Tropical Diseases [WHO/TDR]. MIM is the current convener of the Malaria R&D Alliance.

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