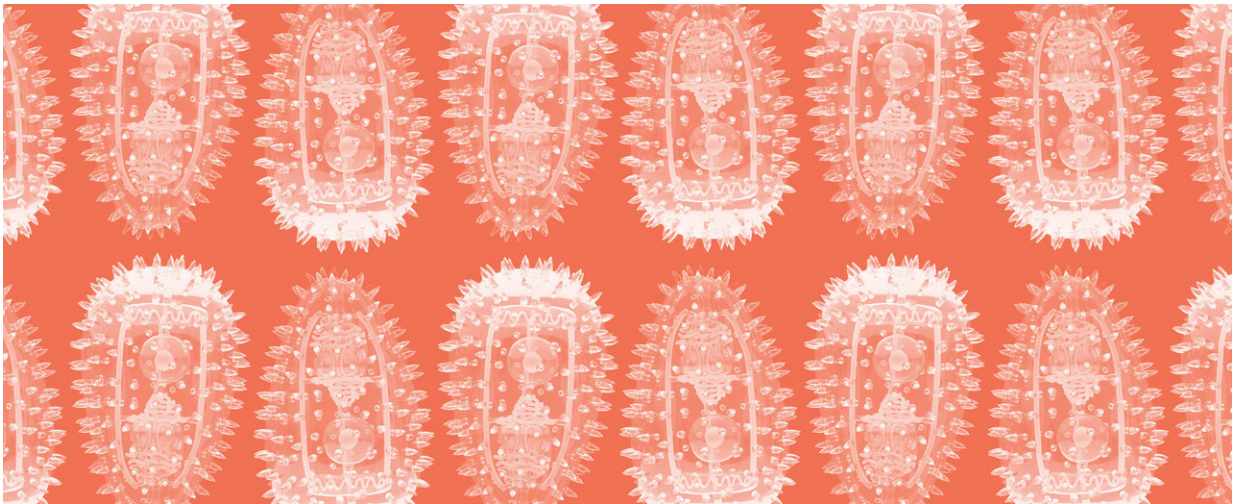


A new research agenda to accelerate malaria elimination and eradication

November 30 2017



P. falciparum merozoites. Glasswork by L. Jerram. Credit: Malaria glasswork by Luke Jerram. Graphic Design by Rachel Papernick

More than 180 scientists, malaria programme leaders and policy makers from around the world have come together through a consultative process to update the research agenda for malaria elimination and eradication, first published in 2011. The outcome is a series of seven 'malERA Refresh' (malaria eradication research agenda) papers that have been published as a special collection in *PLOS Medicine*. The aim of this exercise, coordinated by the Malaria Eradication Scientific Alliance (MESA) with headquarters at the Barcelona Institute for Global

Health (ISGlobal), was to define a forward-looking research and development agenda that will accelerate progress towards malaria elimination and global eradication.

A world free of malaria would present enormous benefits in terms of health, equity and economy. The WHO has set ambitious goals for reducing the burden of malaria, and 21 countries have been identified as having the potential to eliminate local transmission of malaria by 2020. However, there is no easy path to achieving a malaria-free world and there is a real need for innovation. MalERA Refresh sets out a research agenda to meet the challenges, achieve these goals and, in the long-term eradicate it globally.

"The value of malERA Refresh is that it focuses on problems that need to be solved, not only the technologies that could be developed" states MESA chair Dr. Regina Rabinovich (ISGlobal and Harvard T.H. Chan School of Public Health). "Transforming the mindset from implementation to problem solving is an essential task for the next generation of scientists and program implementers," she adds.

The key messages highlighted in the introductory paper of the malERA Refresh collection can be summarized as follows:

- Since 2011 significant progress has been made in R&D, including support for large-scale testing of the first approved vaccine (RTS,S), non-pyrethroid insecticides in the pipeline, new genetic technologies to block parasite transmission by mosquitoes, and identification of markers of drug resistant parasites.
- This progress however has been matched with significant challenges, such as the expansion of insecticide and drug resistance, knowledge gaps particularly when working in low disease transmission settings, and tools to prevent disease

reintroduction. Concerning *Plasmodium vivax* malaria, the most common malaria outside Africa, more is known about its transmission biology and epidemiology but we still lack tools to tackle it. In addition, the continuous evolution of malaria parasites and vectors brings new challenges. An example is the reported rise of *Plasmodium knowlesi* infections in South-East Asia, as well as changes in mosquito biting and resting habits.

- Solutions to these problems require three types of innovation: 1) iterative innovation (for example, new medicines); 2) transformative innovation of tools and strategies to reduce or halt parasite transmission (for example, gene drive technologies); and 3) integrated approaches tailored to local contexts and local variations in disease transmission dynamics.

To update the agenda, six panels with over 180 experts from different disciplines and countries engaged in a collaborative process to address progress made and main challenges in the following areas: basic science and technologies; insecticide and drug resistance; characterising the reservoir and measuring transmission; diagnostics, drugs, vaccines and vector control; combination interventions and modelling; and health systems and policy research.

"A critical recognition of the malERA Refresh is that eradication efforts perturb the ecological balance of [disease transmission](#). This changing landscape requires ongoing research to understand the impact of this perturbation, and the resulting need to change tactics. This iterative process is the core of the malERA Refresh effort," says Professor Dyann Wirth (Harvard T.H. Chan School of Public Health).

Each panel was guided by a chair and co-chair(s) who are renowned experts in their respective fields. The whole process was overseen by a Leadership Group composed of Drs. Regina Rabinovich (ISGlobal and Harvard T.H. Chan School of Public Health), Pedro Alonso (WHO

Global Malaria Programme), Marcel Tanner (Swiss Tropical and Public Health Institute) and Dyann Wirth (Harvard T.H. Chan School of Public Health).

Dr. Rabinovich warns that in order to pursue the opportunities proposed in the agenda, a diverse landscape of funders is needed, as well as "a continuous monitoring of research, its impact and the emergence of new challenges to keep the [malaria](#) community on course."

For Professor Marcel Tanner (Swiss TPH), "MalERA-refresh will give new momentum to science in the public and private sectors and particularly the key R&D efforts that will make elimination possible."

The malERA Refresh collection is considered a complement to the WHO 'Global Technical Strategy for Malaria' (GTS) and the Roll Back Malaria 'Action and Investment to defeat Malaria' (AIM). Pedro Alonso, Director of the WHO Global Malaria Programme, underlined the importance of the updated agenda as a key pathfinder for the Global Observatory on Health R&D and added: "Robust research is critical for the WHO to build evidence-based policies and guidelines."

More information: collections.plos.org/malera-refresh

Rabinovich RN, Drakeley C, Djimde AA, Hall BF, Hay SI, Hemingway J, et al. (2017) malERA: An updated research agenda for malaria elimination and eradication. PLoS Med 14(11): e1002456.
doi.org/10.1371/journal.pmed.1002456

Provided by Barcelona Institute for Global Health (ISGlobal)

Citation: A new research agenda to accelerate malaria elimination and eradication (2017,

November 30) retrieved 7 May 2024 from <https://medicalxpress.com/news/2017-11-agenda-malaria-eradication.html>

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