

Forum: World Health Organization

Issue: Working towards malaria control in high transmission regions

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Introduction

Malaria is one of the most common and severe tropical diseases. Most malaria cases occur in sub-Saharan Africa. However, malaria is also reported in Asia, Latin America and, to a lesser extent, in the Middle East and parts of Europe. Malaria transmission continues in 97 countries and territories. According to The World Health Organization's report on Malaria of 2022, the African Region accounts for 95% of malaria cases and 96% of malaria deaths worldwide. Most deaths occur among children. In Africa, a child dies of malaria every minute.

This disease appeared 150,000 years ago. According to another version, malaria is 100,000 years younger. The first recorded cases of discovery in China date back to approximately 2700 BC.

The disease is carried by mosquitoes of the genus *Anopheles*, infected with malaria plasmodium, the protozoan parasites that act as direct pathogens of the disease. Malarial mosquitoes live mainly in swamps and in small stagnant water bodies, including puddles. In the body of mosquitoes that have drunk the blood of a sick person, a large number of active malaria parasites are formed, which, when the mosquito sucks, first enter the bloodstream, then into the human liver cells. Many countries have eradicated malaria through massive swamp draining campaigns.

The disease begins with malaise, weakness, headache, pain in the muscles, joints, lower back, dry mouth. Then attacks of a sharp increase in temperature, vomiting, indigestion, cough, disorders of the nervous and other systems of the body. Without timely treatment, the disease can end in death. Malaria parasites are found in the blood of a sick person and can only be detected by examining the blood under a microscope. Treatment of this disease is carried out taking into account the type of pathogen and its sensitivity to chemotherapy drugs.

Malaria epidemics can occur when climatic and other conditions suddenly become favourable for transmission in areas where people have little or no immunity to

malaria. In addition, epidemics can occur when immunocompromised people enter areas with high malaria transmission, for example, in search of work or as refugees.

Between 300 and 600 million people are infected with malaria each year, and according to WHO, this figure is increasing by 16% annually. Every year, 1.5 to 3 million people die from malaria (15 times more than from AIDS). Over the past decade, malaria has moved from third place in terms of the number of deaths per year (after pneumonia and tuberculosis) to first among infectious diseases.

Term Definitions

Epidemic

This term usually refers to the rapid spread of disease to a large number of patients among a given population within an area in a short period of time.

Vaccination

A simple, safe, and effective way to protect people from harmful diseases before they come into contact with them. Vaccines activate the body's natural defences, so that they learn to resist specific infections, and strengthen the immune system. Most vaccines are injected, but some are swallowed (oral) or sprayed into the nose.

Eradication

Eradication of a disease is extremely difficult and rarely achieved, since it means permanently eliminating the disease's incidence worldwide so that there is no longer a need for intervention measures.

Blood smear

This term refers to a blood test that gives information about the number and shape of blood cells.

Elimination

Elimination means that the disease is no longer considered to be a major public health issue (there are no new cases of the disease).

Pathogen

A pathogen is a microorganism that can cause disease. Pathogenic microorganisms can be viruses, bacteria, protists or fungi.

Parasite

This term refers to plants or animals that live on or inside another plant or animal. The parasite receives food from the organism on which it lives.

Plasmodium

This term refers to parasitic organisms, some of which cause such a dangerous protozoal disease as malaria.

Background Information

Historical context

According to the latest data, provided by BMC, twenty million years ago, Plasmodium used mosquitoes to infect victims. An analysis of Plasmodium spores led scientists to suggest that cold-blooded creatures could also be sick with malaria. For example, dinosaurs. Later, with the advent of man, parasites adapted to it and began to use us to spread among blood-sucking insects.

Malaria was first described around 2700 BC in the Chinese chronicle. But the first epidemic could have happened much earlier, from 8 to 15 thousand years ago, malaria could have caused a sharp decrease in the number of people on Earth.

Doctors learned that malaria was caused by a single-celled organism in the 1880s. French physician Charles Louis Alphonse Laveran discovered the parasite in the blood of a patient, for which he received the Nobel Prize. In 1894, it was first suggested that mosquitoes carried malaria. This method was confirmed by Giovanni Battista Grassi with the help of volunteers.

Symptoms and diagnosis

Most often, the first symptoms of malaria appear 11–30 days after infection, although both types of Plasmodium, which cause the three-day form, can sleep in the liver for up to 15 months. At the first stage of the disease, pathogens multiply and accumulate in the blood, and the symptoms resemble general poisoning – a person is shivering, nauseous, he experiences weakness, body aches and pain in the joints and limbs. Distinguishing malaria from other infectious diseases at this stage is very difficult.

When there are a lot of plasmodiums in the blood, the height of the disease sets in, which consists of recurrent malaria attacks, or paroxysms. Depending on the type of disease, attacks occur every other day or every two to three days.

The diagnosis is based on the detection of parasites in blood smears. Traditionally, two types of strokes are used - thin and thick. A thin smear makes it possible to more reliably determine the variety of malarial plasmodium, since the appearance of the

parasite is better preserved with this type of examination. A thick smear allows the microscopist to view a larger volume of blood, so this method is more sensitive, but the appearance of the Plasmodium changes, making it difficult to distinguish between Plasmodium varieties.

Treatment

To cure the disease, it is necessary to kill the plasmodia in the blood. For this, antiparasitic drugs are used.

In the treatment of uncomplicated malaria, combination therapy is most often used today. Most often, it contains artemisinin or its derivatives - this is an antiparasitic drug that is made from wormwood, it is effective against all types of malarial Plasmodium.

Combination Therapy

This term usually refers to a therapy that combines more than one method of treatment.

Countries and Organisations Involved

World Health Organisation (WHO)

The World Health Organisation is a specialised agency of the United Nations responsible for international public health. This organisation is actively combating against the transmission of the disease and is working towards the total eradication of the illness. In addition to that, WHO has launched several programs targeted for the elimination of malaria, one of which is Global Malaria Program, that is responsible for coordinating WHO's global efforts to control and eliminate malaria¹.

United to Beat Malaria

United to Beat Malaria, a global grassroots campaign of the UN Foundation, brings together a diverse set of partners, influencers and supporters across the U.S. and around the world to take urgent action to end malaria. For more than 15 years, United to Beat Malaria has helped protect more than 39 million of the world's most vulnerable people by providing bed nets and other life-saving tools, in addition to successfully advocating for increased U.S. leadership and funding for global malaria programs.

Nigeria

Following the World Health Organization 2021 report of Nigeria being the leading country among the four African countries responsible for half of the malaria mortality all over the world, the President of Nigeria, on August 16, 2022, inaugurated the Nigeria End Malaria Council to reduce the malaria burden in the country, serves as a platform to solicit funds for promoting malaria elimination in the country and to ensure the good life and wellbeing of the people.

Democratic Republic of Congo

Malaria is the principal cause of morbidity and mortality in the Democratic Republic of the Congo, accounting for more than 40 percent of all outpatient visits and for 19 percent of deaths among children under five years of age. Approximately 97

¹ <https://www.who.int/teams/global-malaria-programme>

percent of the population lives in zones with stable malaria transmission lasting 8–12 months per year.

United Republic of Tanzania

The entire population of Mainland Tanzania is considered at risk for malaria, although transmission varies significantly among and within regions. 93% of the population in Mainland Tanzania live in malaria transmission areas. Tanzania is among the ten countries with the highest malaria cases and deaths, accounting for 3% of the global cases and deaths, and 4.1% of global deaths in 2020.

Niger

Malaria is endemic throughout Niger and, as one of 11 countries that bear 70% of the global malaria burden, the country is considered under the “High Burden to High Impact” (HBHI) approach². In 2020, Niger accounted for 3.3% of global malaria cases, 2.8% of global deaths due to malaria, and 6.7% of malaria cases in West Africa.

India

Since 2000, India has cut malaria cases by more than half and the number of malaria deaths by more than two-thirds. According to the WHO World Malaria Report 2019, as one of only two top 11 highest malaria burden countries to reduce malaria cases between 2017 and 2018, India registered a remarkable 28% decrease in malaria cases and a 41% decrease in malaria-related deaths. This is in addition to a 24% decline in malaria cases between 2016 and 2017.

² HBHI—a country-led response that was catalysed by WHO and the RBM Partnership in order to reignite the pace of progress in the global malaria fight.

Timeline of Events

- 1947** The National Malaria Eradication Program began in the United States. The disease caused widespread illness among soldiers training in the southern U.S. during World War Two.
- 1951** Malaria was eliminated in the United States through the use of insecticides, drainage ditches and the incredible power of window screens.
- 1955** WHO launched the Global Malaria Eradication Program
- 1975** Europe was declared malaria free. The disease had been endemic in southern countries like Italy, Greece and Portugal.
- 1987** The Mosquirix malaria vaccine candidate was created by scientists working in GlaxoSmithKline laboratories.
- 1988** WHO launched the Roll Back Malaria initiative, leading to increased investment in cheap new drugs, tests and insecticide-treated bed nets.
- 2014** A study in the New England Journal of Medicine found widespread resistance to the world's most effective antimalarial drug, artemisinin, across Southeast Asia, threatening global control efforts.

Relevant UN Treaties/Resolutions

Global technical strategy for malaria 2016-2030

The Global technical strategy for malaria 2016–2030 was adopted by the World Health Assembly in May 2015. It provides a comprehensive framework to guide countries in their efforts to accelerate progress towards malaria elimination. The strategy sets the target of reducing global malaria incidence and mortality rates by at least 90% by 2030.

WHA74.9

The World Health Assembly, the main governing body of the World Health Organization, has adopted a resolution that aims to revitalise and accelerate efforts to end malaria, a preventable and treatable disease that continues to claim more than 400 000 lives annually.

The resolution comes at a critical time as global progress against malaria stalls and the COVID-19 pandemic threatens to further derail efforts to tackle the disease worldwide. The resolution urges Member States to step up the pace of progress through plans and approaches that are consistent with WHO's updated global malaria strategy and the *WHO Guidelines for malaria*.

It calls on countries to extend investment in and support for health services, ensuring no one is left behind; sustain and scale up sufficient funding for the global malaria response; and boost investment in the research and development of new tools.

The E-2020 initiative of 21 malaria-eliminating countries

To meet the elimination milestone of the global strategy, at least 10 countries must report zero indigenous malaria cases by 2020. According to a WHO analysis published in 2016, 21 countries have the potential to reach this target. Through the E-2020 initiative, WHO is working with these countries to scale up efforts to achieve elimination within the 2020 timeline. This includes a Framework for malaria elimination, launched by WHO in March 2017, that provides countries with an updated set of tools,

activities and strategies for interrupting transmission and preventing re-establishment of the disease. The framework also offers a clear and streamlined process for countries to obtain malaria-free certification from WHO.

Roll Back Malaria

Roll Back Malaria is an initiative intended to halve the suffering caused by this disease by 2010. The initiative is being developed as a social movement. Action is directed by national authorities, such as WHO, the United Nations Children's Fund (UNICEF), the United Nations Development Programme (UNDP) and the World Bank backed by a global partnership which consists of development agencies, banks, private sector groups and researchers. The World Health Organization, the World Bank, UNICEF and UNDP founded the partnership in October 1998.

The WHO has established a new Cabinet Project, and a WHO-wide strategy and workplan, to support the partnership. High quality, practical, consistent and relevant technical advice is made available through networks of experts based in research, academic, and disease control institutions, particularly those in endemic countries.

The initiative also supports research and development of new products and tools to control malaria. Implementation of Roll Back Malaria began with a series of in-country consultations in 1998, followed by sub-regional consensus building and inception meetings.

The current period is one of momentum building at the country level, during which national authorities are developing their own strategies with the global partners. It is anticipated that, during the year 2000, RBM movements will become active in at least 30 countries.

Previous Attempts to Solve Issue

Malaria Elimination in the United States (1947-1951)

The National Malaria Eradication Program was a cooperative undertaking by state and local health agencies of 13 southeastern states and the Communicable Disease Center of the U. S. Public Health Service, originally proposed by Dr. L. L. Williams. The program commenced operations on July 1, 1947. It consisted primarily of DDT application to the interior surfaces of rural homes or entire premises in counties where malaria was reported to have been prevalent in recent years.

By the end of 1949, more than 4,650,000 house spray applications had been made. It also included drainage, removal of mosquito breeding sites, and spraying (occasionally from aircrafts) of insecticides. Total elimination of transmission was slowly achieved. In 1949, the country was declared free of malaria. By 1951, CDC gradually withdrew from active participation in the operational phases of the program and shifted its interest to surveillance, and in 1952, CDC participation in operations ceased altogether.

Global Malaria Elimination Program (1955-1969)

Global Malaria Eradication Program (GMEP), an ambitious plan to eradicate malaria worldwide. The Program relied heavily on two tools: the drug chloroquine for prevention and treatment of malaria and the chemical DDT for mosquito control. Over the course of the GMEP era, 15 countries and one territory eliminated malaria (Table 1). A number of other countries succeeded in greatly reducing their malaria burden.¹ But no major success occurred in sub-Saharan Africa and, in many settings, a failure to sustain the Program resulted in resurgences of malaria.

In 1969, GMEP was discontinued, but the longer-term objective remained unchanged. WHO reaffirmed the “ultimate goal of eradication” at the Twenty-second World Health Assembly through resolution WHA 22.39. The next two decades saw a marked increase in malaria incidence worldwide – a result of the abandonment of GMEP and of reduced investment in malaria control. Following the economic crisis of

the early 1970s, funding for malaria control was cut further. In parallel, a rise in mosquito resistance to DDT and parasite resistance to chloroquine was reported in some regions. In many areas, substantial gains in malaria control were lost in resurgences of the disease.

Multilateral Initiative on Malaria

In 1997, the Multilateral Initiative on Malaria brought together prominent scientists and key funding organisations to identify priority research areas for malaria. Over the next decade, increased investment in research yielded the development of highly effective malaria control tools – notably, long-lasting insecticide-treated nets (LLINs), rapid diagnostic tests (RDTs), and artemisinin-based combination therapies (ACTs).

The creation of the Global Fund to Fight AIDS, Tuberculosis and Malaria, the President's Malaria Initiative and other financing mechanisms allowed for the wide-scale deployment of these new tools. 3 Between 2005 and 2014, global investment for malaria control increased from US\$ 960 million to US\$ 2.5 billion annually.

Possible Solutions

Eliminating malaria within a generation is a difficult but achievable goal. Throughout history, we saw numerous examples of some countries eradicating malaria and being honourable called malaria-free. In order to achieve it everywhere in the world, some key-points should be followed:

Tailored Responses

All countries can accelerate progress towards elimination through an effective mix of interventions and strategies tailored to local contexts, such as Insecticide-treated nets (ITNs) or indoor residual spraying. A malaria control strategy that works well in Malaysia, for example, may not be the best approach in Nigeria or Panama.

Country Ownership and Leadership

For elimination efforts to succeed, government stewardship in malaria-endemic countries is essential, together with the engagement and participation of affected communities. Malaria responses within national borders can be optimised through cross border collaboration.

Strengthened Surveillance

Malaria surveillance is the cornerstone of program planning; it helps countries identify gaps in coverage of malaria control tools and take action based on the data received. As countries approach elimination, detecting every infection, or clusters of infections, becomes increasingly important to halt any remaining areas of transmission.

Equity in access to health services

As some countries approach elimination, a high proportion of cases are found among vulnerable populations living in remote areas. Progress can be accelerated by ensuring access to malaria prevention and treatment for all at-risk groups, regardless of their legal status.

Innovation in Malaria control tools

Eliminating malaria in all countries, especially those with a high disease burden, will likely require new tools that are not available today. Investing in the research and development of improved diagnostics, more effective medicines, new insecticides and innovative vector control tools must be a priority.

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