

BI0060 / BIOLOGICAL / Infectious Diseases (Human and Animal)

# Malaria (Human)

## Definition

Malaria is a life-threatening disease caused by parasites that are transmitted to people through the bites of infected female *Anopheles* mosquitoes. It is preventable and curable. In 2018, there were an estimated 228 million cases of malaria worldwide and the estimated number of malaria deaths stood at 405,000 (WHO, 2020).

## Reference

WHO, 2020. Malaria. World Health Organization (WHO). [www.who.int/news-room/fact-sheets/detail/malaria](http://www.who.int/news-room/fact-sheets/detail/malaria) Accessed 4 November 2020.

## Annotations

### Synonyms

Not identified.

### Additional scientific description

Malaria is caused by *Plasmodium* parasites. The parasites are spread to people through the bites of infected female *Anopheles* mosquitoes, called 'malaria vectors'. There are five parasite species that cause malaria in humans, with two – *P. falciparum* and *P. vivax* – posing the greatest threat (WHO, 2020).

In 2018, nearly half of the world's population was at risk of malaria. Most malaria cases and deaths occur in sub-Saharan Africa. In 2018, *P. falciparum* accounted for 99.7% of estimated malaria cases in the World Health Organization (WHO) African Region, 50% of cases in the WHO South-East Asia Region, 71% of cases in the Eastern Mediterranean and 65% in the Western Pacific. *P. vivax* is the predominant parasite in the WHO Region of the Americas, representing 75% of malaria cases (WHO, 2020).

Malaria is an acute febrile illness. In a non-immune individual, symptoms usually appear 10 to 15 days after the infective mosquito bite. The first symptoms – fever, headache, and chills – may be mild and difficult to recognise as malaria. If not treated within 24 hours, *P. falciparum* malaria can progress to severe illness, often leading to death. Children with severe malaria frequently develop one or more of the following symptoms: severe anaemia, respiratory distress in relation to metabolic acidosis, or cerebral malaria. In adults, multi-organ failure is also frequent. In malaria endemic areas, people may develop partial immunity, allowing asymptomatic infections to occur (WHO, 2020).

Some population groups are at considerably higher risk of contracting malaria, and developing severe disease, than others. These include infants, children under 5 years of age, pregnant women and patients with HIV/AIDS, as well as non-immune migrants, mobile populations and travellers. National malaria control programmes need to take special measures to protect these population groups from malaria infection, taking into consideration their specific circumstances (WHO, 2020).

The WHO recommends malaria diagnosis be made using parasite-based diagnostic testing, either by microscopy (allowing visualisation of the parasite) or by malaria rapid diagnostic tests (RDT) that are genus- or species-specific. RDT has been restricted to remote areas with limited access to good quality microscopy services. Diagnosis of all suspected cases should be confirmed by either of these two methods before treatment, as a measure to avoid antimalarial drug resistance (WHO, 2019).

The World Malaria Report 2019 provides a comprehensive update on global and regional malaria data and trends. The report tracks investments in malaria programmes and research as well as progress across all intervention areas: prevention, diagnosis, treatment, elimination and surveillance. It also includes dedicated chapters on the consequences of malaria on maternal, infant and child health, the 'High burden to high impact' approach as well as biological threats to the fight against malaria. The report is based on information received from more than 80 countries and areas with ongoing malaria transmission. This is supplemented by data from national household surveys and databases held by other organizations (WHO, 2019).

The WHO has published guidance on case definitions and classifications, as well as surveillance including vector control monitoring and evaluation (WHO, 2018a).

### **Metrics and numeric limits**

In 2018, an estimated 228 million cases of malaria occurred worldwide (95% confidence interval [CI]: 206–258 million), compared with 251 million cases in 2010 (95% CI: 231–278 million) and 231 million cases in 2017 (95% CI: 211–259 million) (WHO, 2019).

Most malaria cases in 2018 were in the WHO African Region (213 million or 93%), followed by the WHO South-East Asia Region with 3.4% of cases and the WHO Eastern Mediterranean Region with 2.1% (WHO, 2019).

Nineteen countries in sub-Saharan Africa and India carried almost 85% of the global malaria burden. Six countries accounted for more than half of all malaria cases worldwide: Nigeria (25%), the Democratic Republic of the Congo (12%), Uganda (5%), and Cote d'Ivoire, Mozambique and Niger (4% each) (WHO, 2019).

The incidence rate of malaria declined globally between 2010 and 2018, from 71 to 57 cases per 1000 population at risk. However, from 2014 to 2018, the rate of change slowed dramatically, reducing to 57 in 2014 and remaining at similar levels through to 2018 (WHO, 2019).

The WHO South-East Asia Region continued to see its incidence rate fall – from 17 cases of the disease per 1000 population at risk in 2010 to five cases in 2018 (a 70% decrease). In the WHO African Region, case incidence levels also declined from 294 in 2010 to 229 in 2018, representing a 22% reduction. All other WHO regions recorded either little progress or an increase in incidence rate. The WHO Region of the Americas recorded a rise, largely due to increases in malaria transmission in the Bolivarian Republic of Venezuela (WHO, 2019).

Between 2015 and 2018, only 31 countries, where malaria is still endemic, reduced case incidence significantly and were on track to reduce incidence by 40% or more by 2020. Without accelerated change, the Global Technical Strategy for Malaria 2016–2030 (GTS) milestones for morbidity in 2025 and 2030 will not be achieved (WHO, 2019).

Globally, 53% of the *P. vivax* burden is in the WHO South-East Asia Region, with the majority being in India (47%).

In 2018, there were an estimated 405,000 deaths from malaria globally, compared with 416,000 estimated deaths in 2017, and 585,000 in 2010.

Children aged under 5 years are the most vulnerable group affected by malaria. In 2018, they accounted for 67% (272,000) of all malaria deaths worldwide (WHO, 2019).

### **Key relevant UN convention / multilateral treaty**

International Health Regulations (2005), 3rd ed. (WHO, 2016).

### **Examples of drivers, outcomes and risk management**

Epidemics can have severe impacts on population health and economic growth prospects. They are triggered by man-made or natural factors that affect the environment increasing the population of mosquitoes that transmit the parasite. Global climate change may also lead to changes in malaria transmission patterns and may gradually alter the geographical distribution of malaria (WHO, 2018b).

Emergencies, including violent conflicts and natural hazards, often trigger malaria epidemics in displaced populations who may have little or no immunity to malaria. In other cases, epidemics and resurgences can occur as a result of weakened malaria control interventions (WHO, 2018b).

Vector control is the main way to prevent and reduce malaria transmission. If coverage of vector control interventions within a specific area is high enough, then a measure of protection will be conferred across the community. The WHO recommends protection for all people at risk of malaria with effective malaria vector control. Two forms of vector control – insecticide-treated mosquito nets and indoor residual spraying – are effective in a wide range of circumstances. However, management methods can be undermined by emerging insecticide resistance and antimalarial drug resistance (WHO, 2020).

A vaccination against *P. falciparum* (RTS,S/AS01) is the first and, to date, the only vaccine to show partial protection against malaria in young children and is currently under pilot in certain areas of sub-Saharan Africa (WHO, 2020).

The 25th of April is World Malaria Day. The WHO has been responding to malaria via programmes such as the WHO Global Technical Strategy for Malaria 2016-2030, The Global Malaria Programme, and the 'High burden to high impact approach' (WHO, 2020).

## **References**

WHO, 2016. International Health Regulations (2005), 3rd ed. World Health Organization (WHO). [www.who.int/ihr/publications/9789241580496/en](http://www.who.int/ihr/publications/9789241580496/en) Accessed 3 October 2020.

WHO, 2018a. Malaria Surveillance, Monitoring & Evaluation: A Reference Manual. World Health Organization (WHO). [apps.who.int/iris/bitstream/handle/10665/272284/9789241565578-eng.pdf?ua=1](https://apps.who.int/iris/bitstream/handle/10665/272284/9789241565578-eng.pdf?ua=1)

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## **Coordinating agency or organisation**

World Health Organization.