

# MALARIA

## in the WHO EUROPEAN REGION

This information leaflet contains six sections and is intended for a generic and public health audience:

**1. Malaria is present in certain areas of Europe.**

What are the risks in European countries?

**2. Malaria is transmitted by *Anopheles* mosquitoes.**

How is the disease transmitted? What are the risk factors?

**3. Disease characteristics of malaria.**

What are the symptoms and how can it be treated?

**4. Malaria can be prevented.**

What measures can be taken to protect yourself?

**5. WHO response.**

How is WHO responding and what support could you get?

**6. More information is available.**

Where can you find more information and guidance on effective prevention and control activities?



© CDC/James Gathany

### Key messages

- Malaria is a life-threatening disease caused by parasites (genus: *Plasmodium*) that are transmitted to people through the bites of infected mosquitoes (genus: *Anopheles*).
- In 2012, malaria caused an estimated 627 000 deaths, mostly among African children.
- In the WHO European Region, malaria elimination remains on track: only 37 cases of locally acquired malaria were reported in 2013 (in Greece, Tajikistan and Turkey).
- At present, imported malaria remains a significant medical and health issue in many European countries.
- Non-immune travellers from malaria-free areas are very vulnerable to the disease when they become infected.
- Malaria is preventable and curable.
- The WHO Regional Office for Europe continues to support countries in their efforts to reach the agreed targets and goals and to provide technical assistance in the certification of malaria elimination whenever possible.



# 1. Malaria is present in certain areas of Europe

Most malaria cases and deaths occur in sub-Saharan Africa; however, Asia, Latin America and, to a lesser extent, the Middle East and parts of Europe, are also affected. In 2013, 97 countries and territories had ongoing malaria transmission. Since 2000, a tremendous expansion in the financing and coverage of malaria-control programmes has led to a wide-scale reduction in malaria cases and deaths.

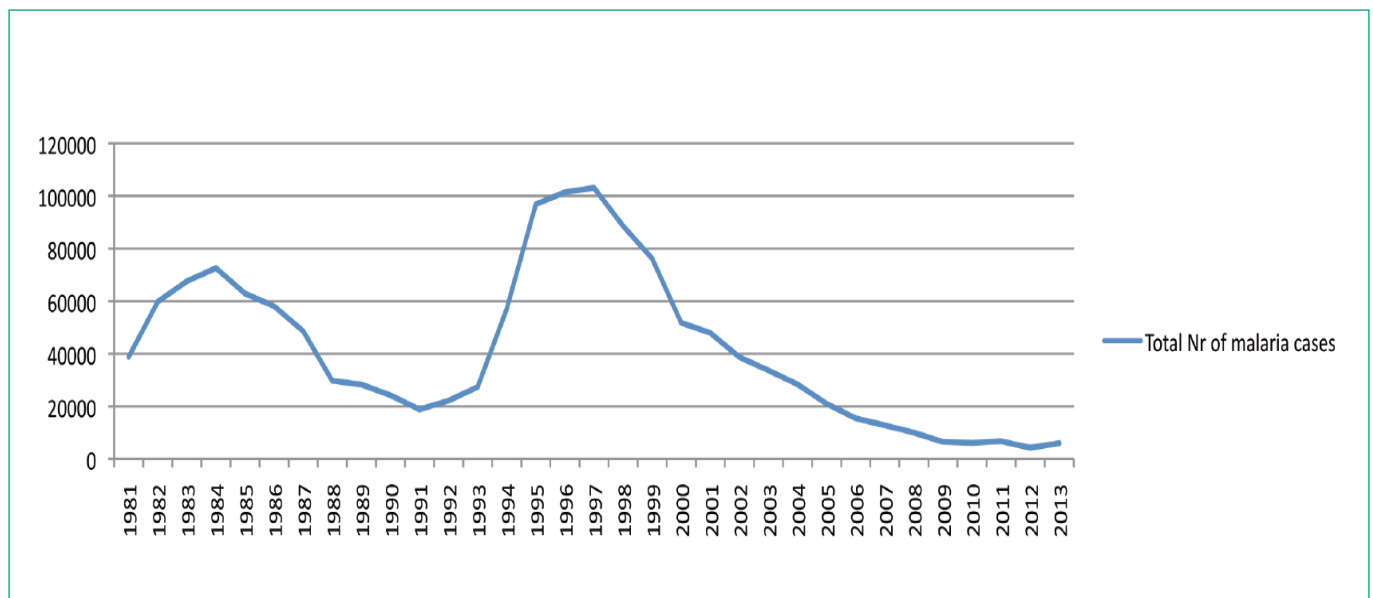
## History of malaria in Europe

The perception that Europe is free from malaria has changed rapidly and, since the early 1980s, the number of countries affected by local malaria transmission has

increased from 3 to 10. At the beginning of the 1990s, the residual reservoir of malaria infection, aggravated by political and socio-economic situations, mass population migration, extensive development projects, and almost discontinued activities on malaria prevention and control, constituted conditions favourable for malaria transmission.

As a result, large-scale epidemics broke out in central Asia and the Transcaucasian countries; in 1995, a total of 90 712 malaria cases were officially reported in the Region (Fig.1). In those years, Azerbaijan, Tajikistan and Turkey suffered explosive and extensive epidemics, while Armenia, Kyrgyzstan and Turkmenistan faced outbreaks on a smaller scale.

Fig 1. Reported number of cases of malaria in all countries of the WHO European Region, 1981-2013.



Source: WHO centralized information system for infectious diseases (CISID).

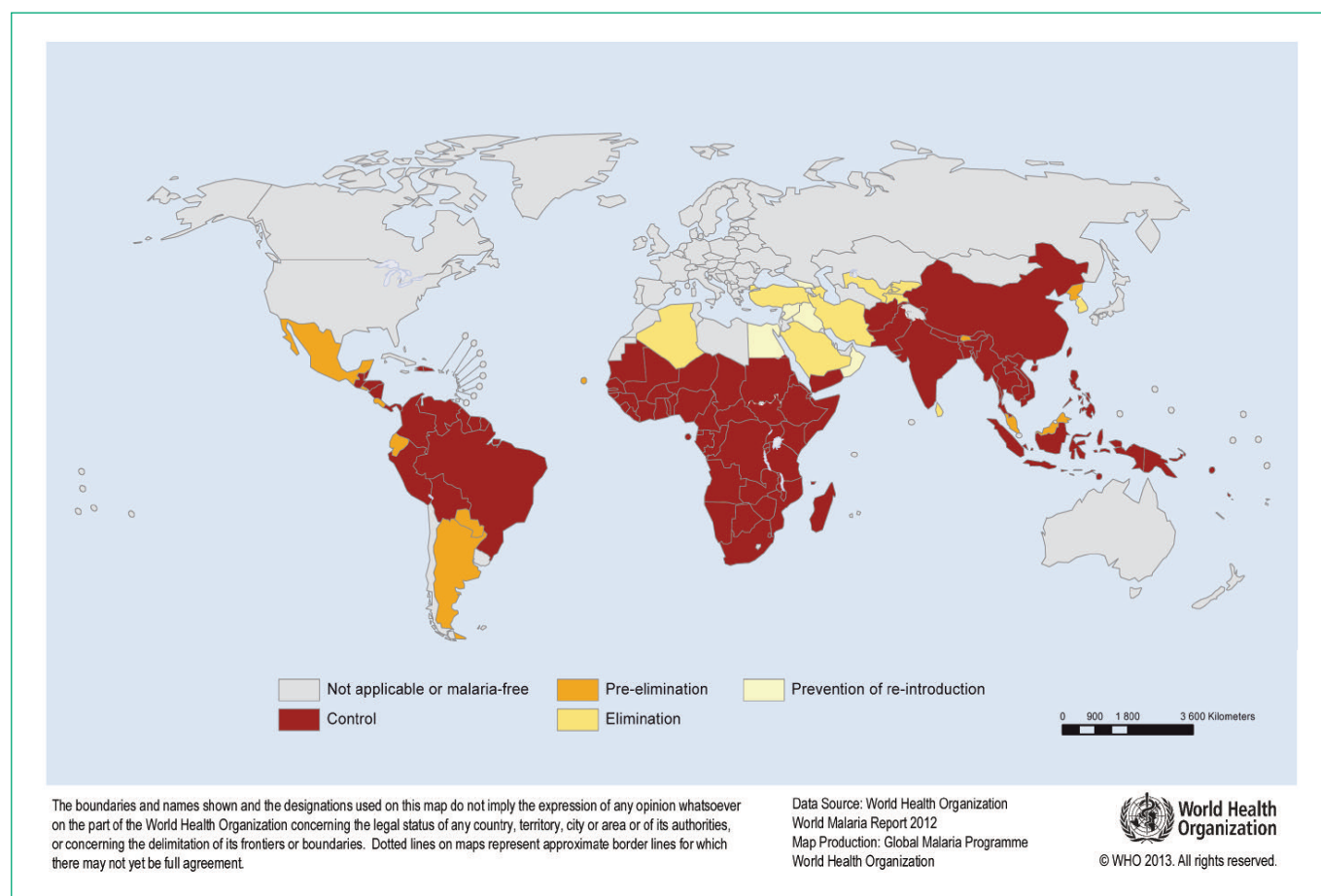
The WHO Regional Office for Europe committed itself to an intensive response to the burden of malaria and, by 1999, had developed the Roll Back Malaria strategy in affected countries of the Region. Between 1995 and 2005, the reported number of locally acquired cases of malaria

declined significantly as a result of large-scale anti-malaria containment activities. Almost all cases occurring in European Union countries were imported from endemic areas.

The WHO European Region is close to attaining the goal of eliminating malaria from the Region by 2015, as set out in the *Tashkent Declaration "The Move from Malaria Control to Elimination" in the WHO European Region (2005)*, which was endorsed by nine malaria-affected countries.

In areas of the Region with relatively low transmission, the intensive application of vector-control measures, combined with sufficient disease management and surveillance activities of adequate quality, have brought the transmission of malaria almost completely under control (Fig. 2).

Fig. 2. Classification of countries by stage of malaria elimination as of December 2012.



Of the nine countries with ongoing transmission in 2000, three have been certified free of malaria (Armenia in 2011, Turkmenistan in 2010 and Kazakhstan in 2012) and two (Kyrgyzstan and Uzbekistan), having reported zero indigenous cases for the past three years or more, are currently in the prevention-of-reintroduction phase. Azerbaijan interrupted transmission of malaria in 2013. The remaining countries (Tajikistan and Turkey) have each achieved a reduction in cases of more than 75%. The transmission of autochthonous *P. falciparum* malaria was interrupted in Tajikistan in 2009, thus eliminating this type of malaria from the entire Region. All locally acquired cases are due to *P. vivax*.

Greece, which had remained malaria free between 1974 and 2010, reported 3 locally acquired *P. vivax* cases in 2010, 40

in 2011 and 20 in 2012; these cases originated initially from migrant workers. In 2013, 3 locally acquired *P. vivax* cases were detected. The experience of Greece highlights the continual threat of reintroduction and the need for continued vigilance to ensure that any resurgence can be rapidly contained.

At present, imported malaria is a significant medical and health issue in many European countries where the disease has been successfully eliminated. Around 5000 imported malaria cases are reported annually in the Region but the magnitude of the problem is thought to be much greater than the statistics indicate and cannot be reliably assessed on the basis of the official data available.



## 2. Malaria is transmitted by mosquitoes

Malaria is caused by *Plasmodium* parasites, which are spread to people through the bites of infected female *Anopheles* mosquitoes.

At present, there are 19 principal and secondary *Anopheles* species in the WHO European Region. All of the important vector species bite at night. *Anopheles* mosquitoes breed in water and each species has its own breeding preference; for example, some prefer shallow collections of fresh water, such as in puddles, rice fields, and hoof prints. Transmission is more intense in places where the mosquito lifespan is longer (so that the parasite has time to complete its development inside the mosquito) and where it prefers to bite humans rather than animals. For example, the long lifespan and strong human-biting habit of the African vector species are the main reasons why more than 90% of the world's malaria deaths occur in Africa.

The intensity of transmission depends on factors related to the parasite, the vector, the human host and the environment. There are four parasite species that cause malaria in humans: *Plasmodium falciparum*; *Plasmodium vivax*; *Plasmodium malariae*; and *Plasmodium ovale*.

In Europe, *Plasmodium vivax* is the most common and the only malaria parasite species present in local transmission but infected travellers or migrants can also carry the other forms. *Plasmodium falciparum* is the most deadly species.

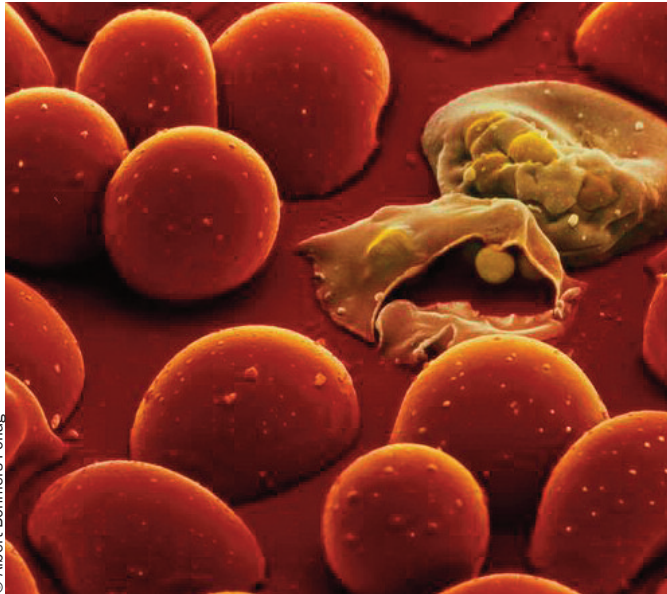
Transmission also depends on climatic conditions that may affect the number and survival of mosquitoes, such as rainfall patterns, temperature and humidity. In many places, transmission is seasonal, peaking during and just after the rainy season.



© WHO

### 3. Disease characteristics of malaria

Malaria is an acute illness, causing fever and influenza-like symptoms. In a non-immune individual, symptoms appear between 7 and 15 days after the infective mosquito bite but longer incubation periods are possible. The first symptoms – fever, headache, chills and vomiting – may be mild and difficult to recognize as malaria. If not treated within 24 hours, *P. falciparum* malaria can progress to severe illness and death. In malaria-endemic areas, people may develop partial immunity, allowing asymptomatic infections to occur.



Clinical relapses of malaria caused by *P. vivax* or *P. ovale* may occur weeks to months after the first infection, even if the patient has left the malarious area. These new episodes arise from dormant liver forms known as hypnozoites (absent in *P. falciparum* and *P. malariae*); special treatment – targeted at these liver stages – is required for a complete cure.

The early diagnosis and treatment of malaria reduces the duration of the disease and prevents death. It also contributes to reducing malaria transmission. The best available treatment, particularly for *P. falciparum* malaria, is artemisinin-based combination therapy (ACT). Resistance to antimalarial medicines is a continuing problem. While many factors likely contribute to the emergence and spread of resistance, the use of oral artemisinins alone, as monotherapy, is thought to be an important driver.

Treatment of malaria with an oral artemisinin-based monotherapy results in the rapid disappearance of symptoms, which may cause patients to discontinue treatment prematurely. This would result in incomplete treatment and such patients would still have persistent parasites in their blood. Without a second drug, given as part of a combination (as provided by ACT), these resistant parasites survive and can be passed on to a mosquito and then to another person.

### 4. Malaria can be prevented

There are currently no licensed vaccines against malaria or any other human parasite. Prevention is based on two complementary methods: vector control to reduce malaria transmission, and chemoprophylaxis.

For individuals, personal protection against mosquito bites represents the first line of defence in malaria prevention. In areas where malaria is endemic, insecticide-treated mosquito nets can offer individual protection at night when malaria transmission is most likely to occur. WHO recommends coverage for all persons at risk, and in most settings. This should be complemented with other methods of protection against mosquito bites, including clothes that

cover most of the body and the use of insect repellent on exposed skin. Repellents can be applied to exposed skin and clothing in strict accordance with product label instructions.

Antimalarial medicines can also be used to prevent malaria. Travellers to malaria-endemic countries can protect themselves through chemoprophylaxis, which suppresses the blood stage of malaria infections, thereby preventing the disease. The choice of drugs depends on the travel destination, the duration of potential exposure to vectors, the parasite resistance pattern, the level and seasonality of transmission, the age the person and, in the case of a woman, whether she is pregnant.

## 5. WHO response

The WHO Global Malaria Programme is responsible for charting the course for malaria control and elimination by:

- setting and communicating evidence-based norms, standards, policies, technical strategies and guidelines, and promoting their adoption;
- keeping an independent score of global progress;
- developing approaches to capacity building, systems' strengthening, and surveillance;
- identifying threats to malaria control and elimination, as well as new areas for action.

The European Centre for Disease Prevention and Control, the European Commission, the European Mosquito Control Association and WHO are working together to raise awareness of the problem and provide advice to countries on surveillance and control activities.

Tracking progress is a major challenge in malaria control. Malaria surveillance systems detect only around 14% of the estimated global number of cases. Stronger malaria surveillance systems are urgently needed to enable a timely and effective malaria response in endemic regions, prevent outbreaks and resurgences, track progress and hold governments and the global malaria community accountable. In April 2012, the WHO Director-General launched global surveillance manuals on malaria control and elimination and urged endemic countries to strengthen their malaria surveillance systems. This was embedded in a new WHO initiative, "T3: Test. Treat. Track", to scale up diagnostic testing, treatment and surveillance of malaria.

WHO also recommends the routine monitoring of antimalarial drug resistance and supports countries in strengthening their efforts in this important area.

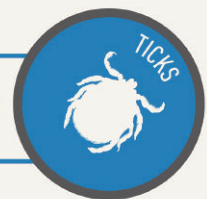
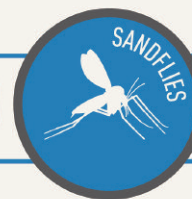
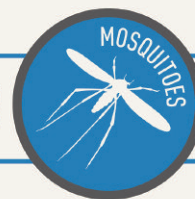
### Box 1. What is a vector-borne disease?

- Vector-borne diseases are illnesses caused by pathogens in human populations.
- These diseases are spread by vectors: living organisms that can transmit pathogens between humans or from animals to humans.
- Many vectors are bloodsucking insects, which ingest pathogens during a blood meal from infected hosts (humans or animals) and transfer them to new hosts during subsequent blood meals.
- Mosquitoes are the best known disease vectors. Others include certain species of ticks, flies, sandflies, and fleas.

## VECTORS MAY BE A THREAT TO YOU, AT HOME AND WHEN TRAVELLING

**VECTORS** ARE SMALL ORGANISMS THAT CARRY SERIOUS DISEASES

COMMON VECTORS



## 6. More information is available

### WHO documents

Disease surveillance for malaria elimination: an operational manual. Geneva: World Health Organization; 2012 (<http://www.who.int/malaria/publications/atoz/9789241503334/en/>).

Ejov M. Scaling up the response to malaria in the WHO European Region: progress towards curbing an epidemic 2000-2004. Copenhagen: World Health Organization; 2005 (<http://www.euro.who.int/en/health-topics/communicable-diseases/vector-borne-and-parasitic-diseases/publications/pre-2009/scaling-up-the-response-to-malaria-in-the-who-european-region-progress-towards-curbing-an-epidemic-20002004>).

Greater effort needed to eliminate malaria from Europe by 2015[website]. Copenhagen: World Health Organization; 2013 (<http://www.euro.who.int/en/health-topics/health-determinants/millennium-development-goals/news/news/2013/04/greater-effort-needed-to-eliminate-malaria-from-europe-by-2015>).

International travel and health [website]. Geneva: World Health Organization; 2014 (<http://www.who.int/ith/en/>).

Regional strategy: from malaria control to elimination in the WHO European Region 2006-2015. Copenhagen: WHO Regional Office for Europe; 2006 (<http://www.euro.who.int/en/health-topics/communicable-diseases/vector-borne-and-parasitic-diseases/publications/pre-2009/regional-strategy-from-malaria-control-to-elimination-in-the-who-european-region-2006-2015>).

The Tashkent Declaration “The move from malaria control to elimination” in the WHO European Region. Copenhagen: WHO Regional Office for Europe; 2005 (<http://www.euro.who.int/en/health-topics/communicable-diseases/vector-borne-and-parasitic-diseases/publications/pre-2009/tashkent-declaration-the-move-from-malaria-control-to-elimination>).

WHO European Region aims to wipe out malaria in 4 years: Roll Back Malaria partners target strongholds of the disease [website]. Copenhagen: World Health Organization; 2011 (<http://www.euro.who.int/en/media-centre/sections/latest-press-releases/who-european-region-aims-to-wipe-out-malaria-in-4-years-roll-back-malaria-partners-target-strongholds-of-the-disease> ).

World Malaria Report 2013. Geneva: World Health Organization; 2013 ([http://www.who.int/malaria/publications/world\\_malaria\\_report\\_2013/en/](http://www.who.int/malaria/publications/world_malaria_report_2013/en/)).

### External resources

Asklung H et al. Management of imported malaria in Europe. Malaria Journal. 2012;11:328 (<http://www.malariajournal.com/content/pdf/1475-2875-11-328.pdf>).

Factsheet for health professionals – malaria [website]. Stockholm: European Centre for Disease Prevention and Control; 2014 ([http://www.ecdc.europa.eu/en/healthtopics/malaria/factsheet-health-professionals/Pages/factsheet\\_health\\_professionals.aspx](http://www.ecdc.europa.eu/en/healthtopics/malaria/factsheet-health-professionals/Pages/factsheet_health_professionals.aspx)).



# MALARIA in the WHO EUROPEAN REGION



**WHO Regional Office for Europe**  
UN City, Marmorvej 51  
DK-2100 Copenhagen Ø, Denmark  
<http://www.euro.who.int>