

Malaria

Annual Epidemiological Report for 2020

Key facts

- For 2020, 2 377 malaria cases were reported in the EU/EEA, 2 369 (> 99%) of which were confirmed.
- Among 2 088 cases with known importation status, 99.8% were travel-related. Five confirmed cases were reported as acquired in the EU (three by France and two by Greece).
- The number of cases was substantially lower than in previous years, probably due to the reduction in travel during the COVID-19 pandemic. As in previous years, the overall rate of confirmed malaria cases was higher among men than women (0.4 cases and 0.2 cases per 100 000 population, respectively; male-to-female ratio 1.9:1).

Introduction

Malaria in humans is an acute or sub-acute infectious disease caused by one of six protozoan species of the genus *Plasmodium*: *P. falciparum*, *P. vivax*, *P. ovale wallikeri*, *P. ovale curtisi*, *P. malariae* and *P. knowlesi*, transmitted by *Anopheles* mosquitoes. Occasionally, transmission occurs by blood transfusion, organ transplantation, needle-sharing, or congenitally from mother to foetus.

Malaria is one of the major public health problems in the world, and in 2020 it caused an estimated 241 million infections in 85 endemic countries and approximately 627 000 deaths [1]. Malaria transmission occurs in large areas of Central and South America, Africa, Asia and Oceania. Infections with *P. falciparum* and *P. vivax* represent a major part of the global burden of malaria.

There is no animal reservoir for *P. falciparum*, *P. vivax*, *P. ovale*, or *P. malariae*. Macaques are the animal reservoir for *P. knowlesi*.

Methods

This report is based on data for 2020 retrieved from The European Surveillance System (TESSy) on 25 October 2021. TESSy is a system for the collection, analysis and dissemination of data on communicable diseases.

For a detailed description of methods used to produce this report, refer to the *Methods* chapter [2].

An overview of the national surveillance systems is available online [3].

A subset of the data used for this report is available through ECDC's online *Surveillance atlas of infectious diseases* [4].

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For 2020, 28 EU/EEA countries reported data on malaria (Denmark and Liechtenstein did not report). As the United Kingdom (UK) withdrew from the EU on 31 January 2020, the country no longer provides data to ECDC. Twenty-six countries reported case-based data and two reported aggregated data (Belgium and Bulgaria). Twenty-six countries used the EU case definition, two (France and Germany) used an alternative case definition. Surveillance is comprehensive and mostly passive. Reporting is compulsory in 27 countries and voluntary in France. No notification rate was calculated for France.

Epidemiology

For 2020, 2 377 malaria cases were reported in the EU/EEA, 2 369 (> 99%) of which were confirmed. France reported the highest number of cases, followed by Germany and Belgium (Table 1, Figure 1).

The overall notification rate was 0.3 cases per 100 000 population, which is significantly lower than the 2016–2019 period, during which the notification rate was 1.2. The notification rate was highest in Sweden (1.3 per 100 000 population), followed by Finland and Norway (0.9 per 100 000 population). Age-standardised notification rates (ASR) did not differ substantially from crude rates (Table 1).

Table 1. Distribution of confirmed malaria cases and rates per 100 000 population by country and year, EU/EEA, 2016–2020

Country	2016		2017		2018		2019		2020		
	Number	Rate	Number	Rate	Number	Rate	Number	Rate	Number	Rate	ASR
Austria	82	0.9	78	0.9	62	0.7	72	0.8	27	0.3	0.3
Belgium	311	NR	249	NR	357	NR	417	NR	241	NR	NR
Bulgaria	28	0.4	8	0.1	8	0.1	8	0.1	5	0.1	0.1
Croatia	4	0.1	10	0.2	2	0.0	3	0.1	0	0.0	0.0
Cyprus	1	0.1	8	0.9	4	0.5	4	0.5	0	0.0	0.0
Czechia	38	0.4	27	0.3	34	0.3	32	0.3	9	0.1	0.1
Denmark	102	1.8	94	1.6	64	1.1	ND	NR	ND	NR	NR
Estonia	1	0.1	2	0.2	3	0.2	3	0.2	1	0.1	0.1
Finland	47	0.9	36	0.7	34	0.6	50	0.9	52	0.9	1.0
France	2 447	NR	2 712	NR	2 840	NR	2 839	NR	1 007	NR	NR
Germany	962	1.2	957	1.2	899	1.1	999	1.2	366	0.4	0.5
Greece	121	1.1	107	1.0	55	0.5	40	0.4	23	0.2	0.2
Hungary	17	0.2	12	0.1	17	0.2	12	0.1	10	0.1	0.1
Iceland	2	0.6	3	0.9	3	0.9	4	1.1	0	0.0	0.0
Ireland	88	1.9	78	1.6	60	1.2	80	1.6	15	0.3	0.3
Italy	888	1.5	830	1.4	722	1.2	811	1.3	166	0.3	0.3
Latvia	3	0.2	1	0.1	4	0.2	4	0.2	0	0.0	0.0
Liechtenstein	ND	NR	ND	NR	ND	NR	ND	NR	ND	NR	NR
Lithuania	3	0.1	6	0.2	6	0.2	7	0.3	0	0.0	0.0
Luxembourg	5	0.9	11	1.9	13	2.2	13	2.1	5	0.8	0.8
Malta	7	1.6	12	2.6	7	1.5	20	4.1	1	0.2	0.2
Netherlands	245	1.4	202	1.2	252	1.5	180	1.0	68	0.4	0.4
Norway	75	1.4	61	1.2	54	1.0	196	3.7	48	0.9	0.9
Poland	38	0.1	27	0.1	28	0.1	24	0.1	7	0.0	0.0
Portugal	197	1.9	92	0.9	102	1.0	116	1.1	59	0.6	0.6
Romania	21	0.1	15	0.1	18	0.1	22	0.1	2	0.0	0.0
Slovakia	4	0.1	0	0.0	3	0.1	6	0.1	2	0.0	0.0
Slovenia	6	0.3	11	0.5	3	0.1	6	0.3	2	0.1	0.1
Spain	755	1.6	818	1.8	851	1.8	783	1.7	115	0.2	0.3
Sweden	154	1.6	150	1.5	189	1.9	205	2.0	138	1.3	1.4
UK	1 574	2.4	1 810	2.7	1 669	2.5	1 706	2.6	ND	NR	NR
EU-EEA	8 226	1.2	8 427	1.2	8 363	1.2	8 662	1.2	2 369	0.3	0.3

Source: country reports.

ND: no data reported

NR: no rate calculated.

ASR: age-standardised rate

Figure 1. Distribution of confirmed malaria cases by country, EU/EEA, 2020

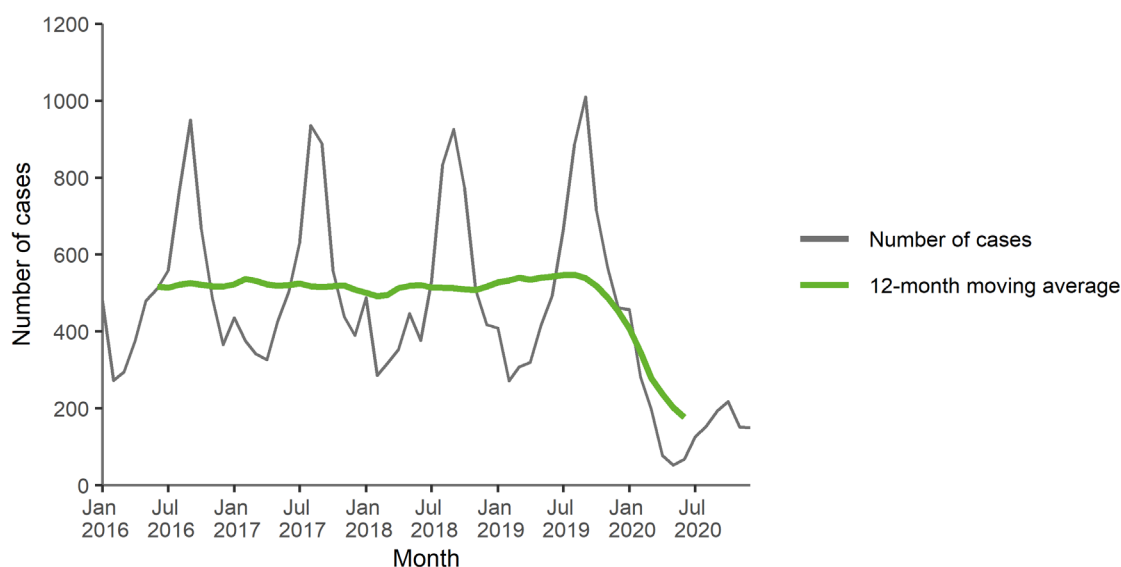
Source: country reports from Austria, Belgium, Bulgaria, Croatia, Cyprus, Czechia, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain and Sweden.

Of 1 988 confirmed cases for which the *Plasmodium* species was reported, 1 644 (82.7%) had *P. falciparum*, 168 (8.5%) had *P. ovale*, 93 (4.7%) had *P. vivax*, 81 (4.1%) had *P. malariae*, and two (0.1%) had *P. knowlesi*. The case fatality was 1.1% among all 1 038 malaria cases with known outcome.

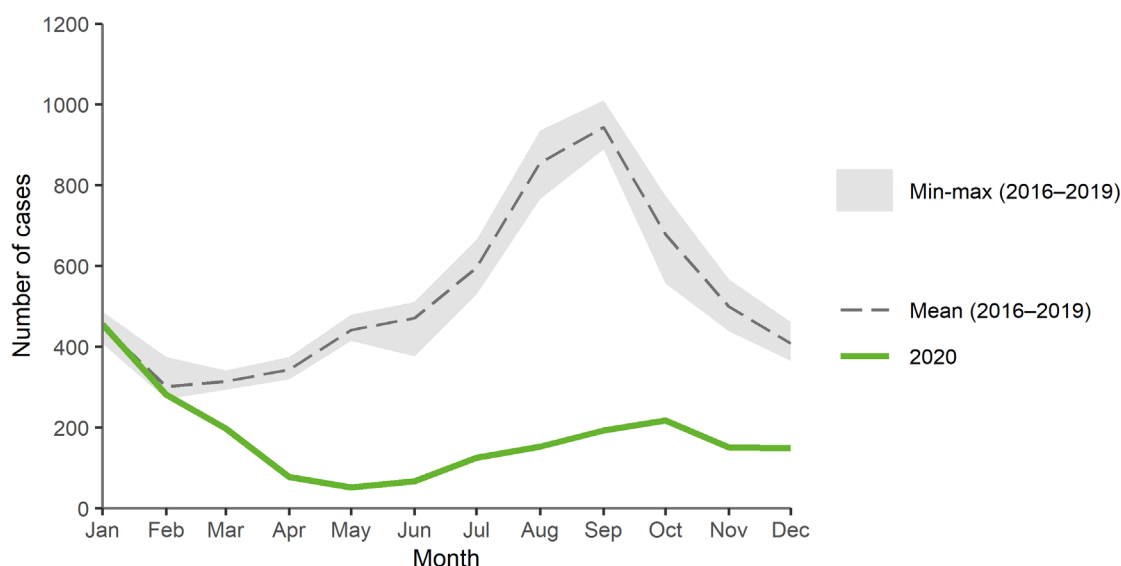
Of 2 093 cases with known importation status, 99.8% (2 088 cases) were travel-related. Five cases were reported as acquired in the EU (three by France and two by Greece). Both cases in Greece were classified as being the first generation of transmission [5]. The cases reported in France were caused by mosquitos imported by plane, often referred to as airport malaria. In addition to data reported through TESSy, Belgium reported two epidemiologically linked deaths, due to malaria, probably resulting from infection by a mosquito transported by plane [6].

Since (before) 2015 and until 2019, the annual notification rate has been stable (Table 1). However, the rate was much reduced in 2020, probably due to the reduction in travel during the COVID-19 pandemic.

A marked seasonal trend was observed across the 25 countries consistently reporting malaria from 2016 to 2020, with cases increasing during and immediately after the summer holiday months (July–September). Although there was still a seasonal trend (with a peak in October), the level and amplitude of the seasonality were much lower in 2020, and the pattern was probably strongly influenced by travel restrictions due to the COVID-19 pandemic. The highest number of cases was observed early in the year (January–March), before many COVID-19 pandemic-related travel restrictions were in place, falling to a minimum in May and then gradually increasing to the peak in October (Figure 2).

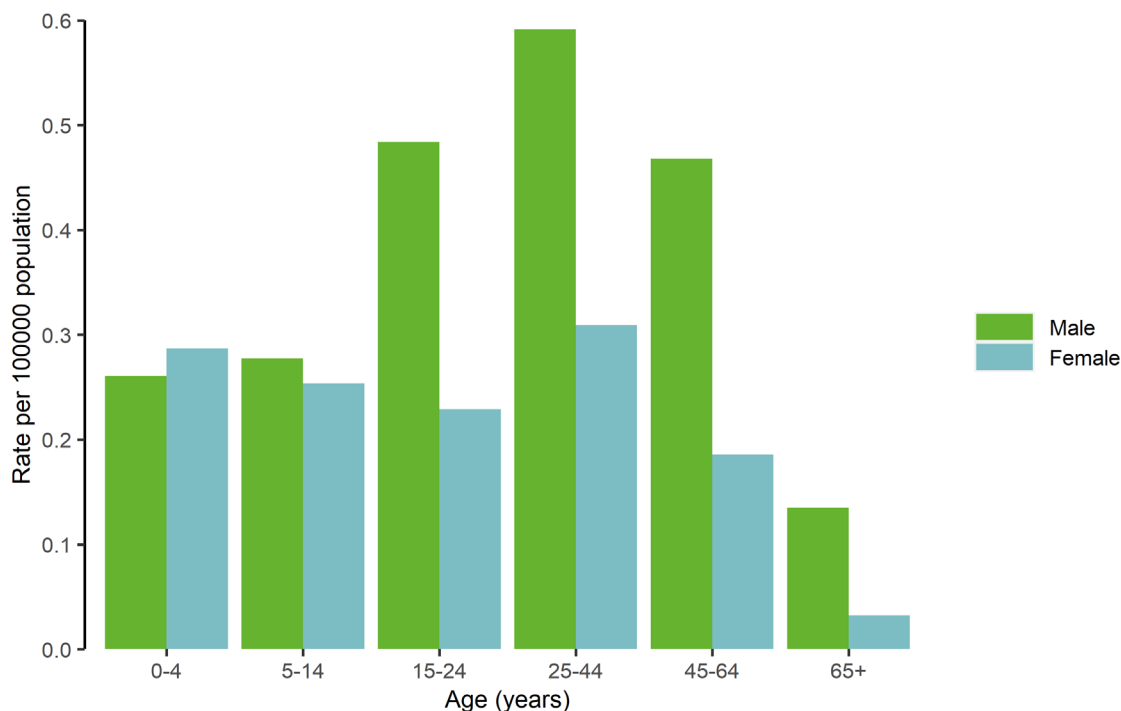
Figure 2. Distribution of confirmed malaria cases by month, EU/EEA, 2016–2020

Source: country reports from Austria, Cyprus, Czechia, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden.

Figure 3. Distribution of confirmed malaria cases by month, EU/EEA, 2016–2019 and 2020

Source: country reports from Austria, Cyprus, Czechia, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden.

In 2020, the overall rate of confirmed malaria cases was higher among men than women (0.4 and 0.2 cases per 100 000 population, respectively; male-to-female ratio: 1.9:1). In both men and women, the notification rate was highest in the age group 25–44 years (0.6 and 0.3 cases per 100 000 population, respectively), followed by 15–24 years for men (0.5) and 0–4 years for women (0.3) (Figure 4).

Figure 4. Distribution of confirmed malaria rate per 100 000 population, by age and gender, EU/EEA, 2020

Discussion

The incidence rate of malaria is estimated to have decreased by 27% globally between 2010 and 2019. However, in 2020, 14 million more cases (6.2% increase) and 69 000 more deaths (12.4% increase) were recorded compared to 2019. Approximately two-thirds of the additional deaths have been linked to disruptions in the provision of malaria prevention, diagnosis, and treatment during the COVID-19 pandemic [7]. *Plasmodium falciparum* is the most prevalent malaria parasite in West Africa (almost 100%), Central Africa (100%), high transmission countries in East and Southern Africa (almost 100%), low transmission countries in East and Southern Africa (91%), the Eastern Mediterranean (74%), the Western Pacific (70%), and South-East Asia (60%), while *P. vivax* is the dominant malaria species in the Americas (75%) [1]. The increase in global malaria incidence between 2019 and 2020 has not resulted in an increase in the notification rate observed in the EU/EEA.

Nearly all malaria cases reported by EU/EEA countries for 2020 were imported. The countries reporting the highest numbers of cases have historical, economic, linguistic and cultural links with endemic areas, particularly in Africa and the Americas. Most of the imported malaria cases in France are linked to travel routes from West Africa [8]. Time and age distribution of cases in Europe most probably reflects travel patterns to malaria-endemic countries. Literature suggests that a substantial proportion of imported malaria cases in the EU/EEA occur among recent immigrants from malaria-endemic countries and more settled migrants and their families who have travelled to visit friends and relatives in malaria-endemic home countries [9]. The number reported in 2020 was affected by the COVID-19 pandemic. Travel restrictions, as well as personal behavioural changes, resulted in a decrease in travel, which is the main driver of malaria cases in the EU/EEA. Outside Europe, certain EU territories are endemic for malaria, including French Guiana and Mayotte. Data for these regions are not collected through TESSy.

A small number (five through TESSy and two through literature) of sporadic autochthonous malaria cases were reported in the EU/EEA in 2020, but no sustained transmission has been reported [5,6].

Public health implications

Awareness of malaria among clinicians and travellers, particularly among people visiting friends and relatives in malaria-endemic countries, should remain a focus of attention. Individuals visiting friends and relatives in malaria-endemic countries often have an incorrect risk perception and are less likely than other travellers to seek pre-travel advice and use the recommended malaria prevention measures. In addition, the duration of their trips tends to be longer [10]. In Europe, malaria chemoprophylaxis is only recommended for travellers to malaria-endemic countries, which are classified into several groups to determine the most effective drug regimen (see WHO requirements and recommendations for international travellers, including a list of affected countries, as of 2020 [11]). The choice of prophylactic drugs and prevention measures depends mainly on local malaria epidemiology, duration of potential

exposure to vectors, parasite resistance patterns, level and seasonality of transmission, prophylactic drug tolerance, age and pregnancy. Due to the nocturnal feeding habits of most *Anopheles* mosquitoes, protection measures against mosquito bites include the use of (preferably long-lasting insecticidal) bed nets, clothes that cover most of the body, and insect repellent on exposed skin.

With regard to malaria transmission through substances of human origin (e.g. blood products or organ transplants), vigilance should remain high. Healthcare providers should be aware that hospital transmission of malaria is rare but possible, irrespective of the *Plasmodium* species involved. Clinicians should therefore consider the possibility of hospital-acquired malaria in hospitalised or recently discharged patients developing an unexplained fever or malaria-like clinical syndrome, especially if their hospital admission coincided with that of another patient admitted with malaria [12].

Data also indicate that local transmission of *P. vivax* remains possible in the EU, with sporadic reports of introduced cases. This emphasises the need for continuous malaria surveillance, preparedness and prevention in the EU/EEA.

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