

Malaria

Annual Epidemiological Report for 2019

Key facts

- For 2019, 8 641 malaria cases were reported in the EU/EEA, 8 638 (> 99%) of which were confirmed.
- Among 5 509 cases with known importation status, 99.8% were travel-related. Nine confirmed cases were reported as acquired in the EU (two each by Germany, Greece, Spain and France, and one by the Netherlands).
- A marked seasonal trend was observed across all countries, with cases increasing during and immediately after the summer holiday months (July–September).
- As in previous years, the overall rate of confirmed malaria cases was higher among men than women (1.8 cases and 0.8 cases per 100 000 population respectively; male-to-female ratio 1.8:1).

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 through blood transfusion, organ transplantation, needle-sharing, or congenitally from mother to foetus.

Malaria is one of the world's major public health problems, causing 229 million infections in 87 endemic countries and approximately 409 000 deaths in 2019 [1]. Malaria transmission occurs in large areas of Central and South America, Africa, Asia and Oceania. Infections with *P. falciparum* and *P. vivax* represent the 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 of *P. knowlesi*.

Methods

This report is based on data for 2019 retrieved from The European Surveillance System (TESSy) on 17 November 2020. 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].

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

For 2019, 29 EU/EEA countries reported data on malaria (Denmark and Liechtenstein did not report). Twenty-seven 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, and one (Belgium) did not specify the case definition used. Surveillance is comprehensive and mostly passive. Reporting is compulsory in 26 countries, voluntary in France and Belgium, and classified as 'other' in the United Kingdom. No notification rate was calculated for France.

Epidemiology

For 2019, 8 641 malaria cases were reported in the EU/EEA, 8 638 (> 99%) of which were confirmed. France reported the highest number of cases, followed by the United Kingdom and Germany (Table 1, Figure 1).

The overall notification rate was 1.3 cases per 100 000 population, similar to the 2015–2017 period, while it was 1.2 in 2018. The notification rate was highest in Malta (4.1 per 100 000 population), followed by Belgium (3.7 per 100 000 population) and the United Kingdom (2.6 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, 2015–2019

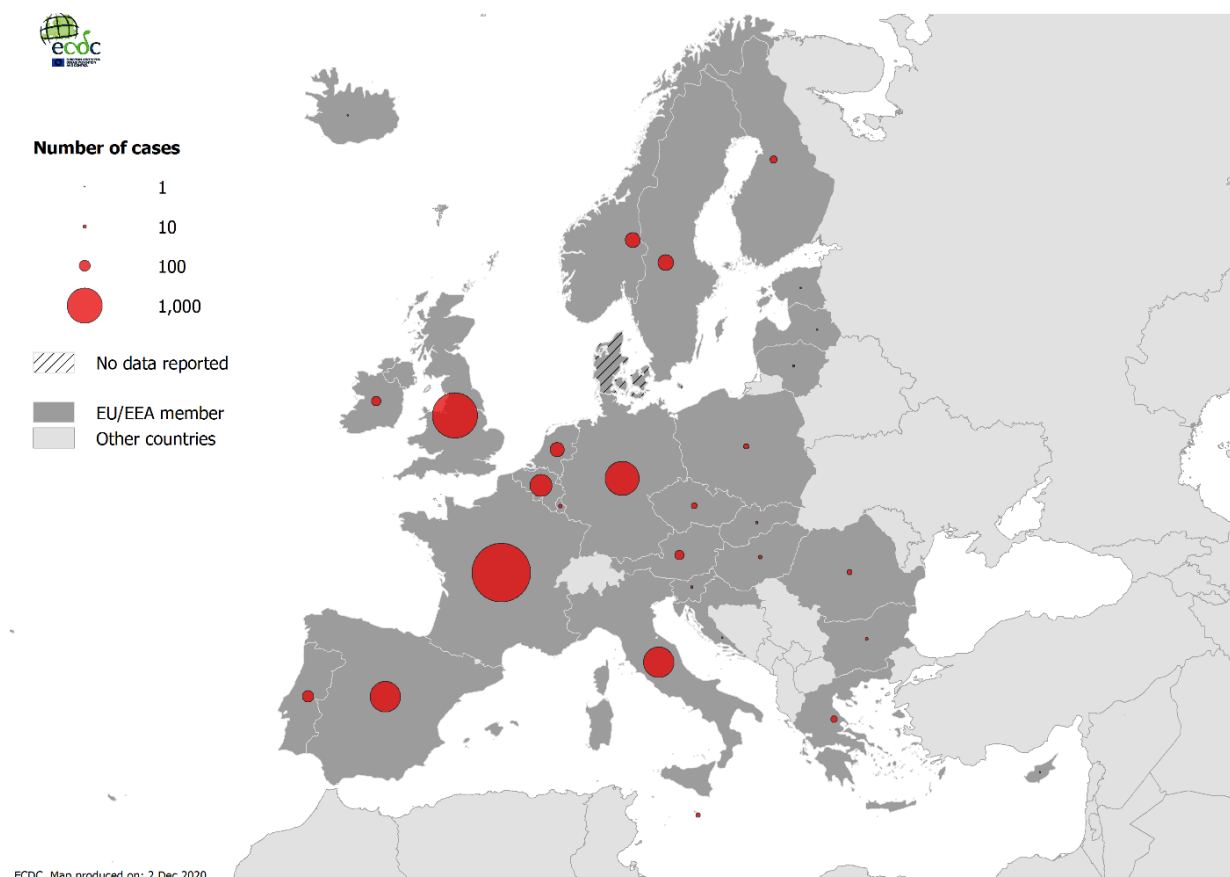
Country	2015		2016		2017		2018		2019		
	Number	Rate	Number	Rate	Number	Rate	Number	Rate	Number	Rate	ASR
Austria	81	0.9	82	0.9	78	0.9	62	0.7	72	0.8	0.8
Belgium	276	2.5	311	2.7	249	2.2	357	3.1	417	3.6	3.7
Bulgaria	20	0.3	28	0.4	8	0.1	8	0.1	8	0.1	0.1
Croatia	7	0.2	4	0.1	10	0.2	2	0.0	3	0.1	0.1
Cyprus	3	0.4	1	0.1	8	0.9	4	0.5	4	0.5	0.4
Czechia	29	0.3	38	0.4	27	0.3	34	0.3	32	0.3	0.3
Denmark	101	1.8	102	1.8	94	1.6	64	1.1	-	-	-
Estonia	4	0.3	1	0.1	2	0.2	3	0.2	3	0.2	0.2
Finland	39	0.7	47	0.9	36	0.7	34	0.6	50	0.9	1.0
France	2500	-	2447	-	2712	-	2840	-	2840	-	-
Germany	1061	1.3	962	1.2	957	1.2	899	1.1	993	1.2	1.3
Greece	84	0.8	121	1.1	107	1.0	55	0.5	40	0.4	0.4
Hungary	12	0.1	17	0.2	12	0.1	17	0.2	12	0.1	0.1
Iceland	-	-	2	0.6	3	0.9	3	0.9	4	1.1	1.0
Ireland	82	1.8	88	1.9	78	1.6	60	1.2	80	1.6	1.6
Italy	706	1.2	888	1.5	830	1.4	722	1.2	792	1.3	1.4
Latvia	1	0.1	3	0.2	1	0.1	4	0.2	4	0.2	0.2
Liechtenstein	.	.	.	.	.	.	.	.	.	.	.
Lithuania	8	0.3	3	0.1	6	0.2	6	0.2	7	0.3	0.3
Luxembourg	1	0.2	5	0.9	11	1.9	13	2.2	13	2.1	2.1
Malta	7	1.6	7	1.6	12	2.6	7	1.5	20	4.1	3.9
Netherlands	680	4.0	245	1.4	202	1.2	252	1.5	180	1.0	1.1
Norway	94	1.8	75	1.4	61	1.2	54	1.0	196	3.7	3.6
Poland	29	0.1	38	0.1	27	0.1	28	0.1	24	0.1	0.1
Portugal	194	1.9	197	1.9	92	0.9	102	1.0	116	1.1	1.2
Romania	30	0.2	21	0.1	15	0.1	18	0.1	22	0.1	0.1
Slovakia	0	0.0	4	0.1	0	0.0	3	0.1	6	0.1	0.1
Slovenia	5	0.2	6	0.3	11	0.5	3	0.1	6	0.3	0.3
Spain	706	1.5	755	1.6	818	1.8	851	1.8	783	1.7	1.7
Sweden	250	2.6	154	1.6	150	1.5	189	1.9	205	2.0	2.1
United Kingdom	1397	2.2	1574	2.4	1810	2.7	1669	2.5	1706	2.6	2.6
EU-EEA	8407	1.3	8226	1.3	8427	1.3	8363	1.2	8638	1.3	1.3

Source: Country reports.

∴: no data reported

-: no rate calculated.

ASR: age-standardised rate

Figure 1. Distribution of confirmed malaria cases by country, EU/EEA, 2019

ECDC. Map produced on: 2 Dec 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, Sweden and the United Kingdom.

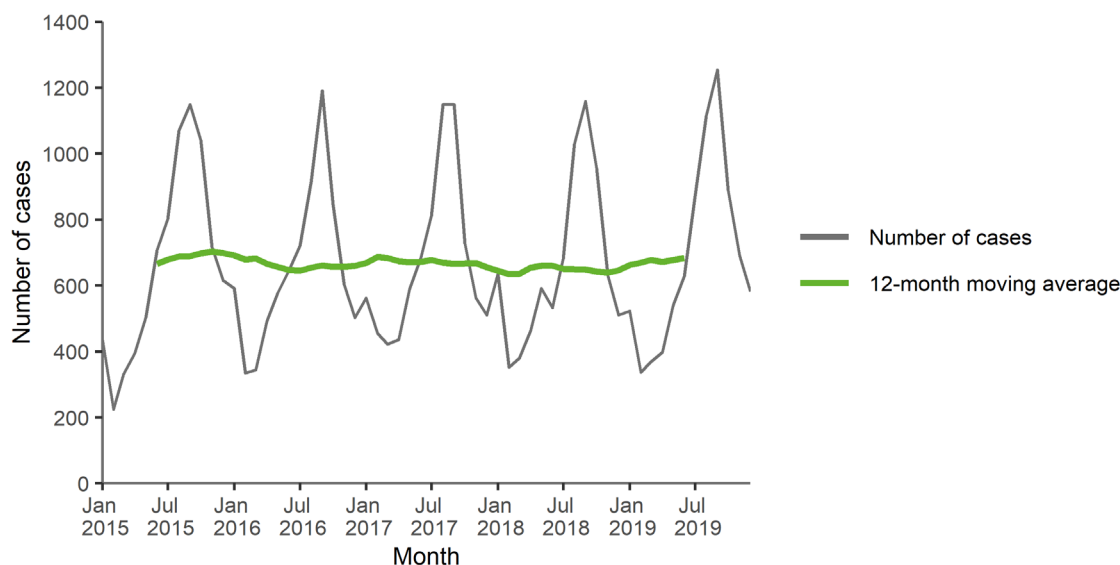
Of 4 911 confirmed cases for which the *Plasmodium* species was reported, 4 331 (88.2%) had *P. falciparum*, 210 (4.3%) had *P. vivax*, 241 (4.9%) had *P. ovale*, 126 (2.6%) had *P. malariae*, one had *P. knowlesi* and two cases were mixed infections with various *Plasmodium* species. Among all 3 249 malaria cases with known outcome the case fatality was 1.2%.

Among 5 509 cases with known importation status, 99.8% were travel-related. Nine confirmed cases were reported as acquired in the EU (two each in Germany, Greece, Spain and France, and one in the Netherlands) [5-7]. The cases in Germany and Greece were infected via vector-borne transmission, while for the cases in Spain and France, the route of transmission is unknown. The case acquired in the Netherlands was infected in a laboratory setting.

The notification rate has been stable since 2015 (Table 1).

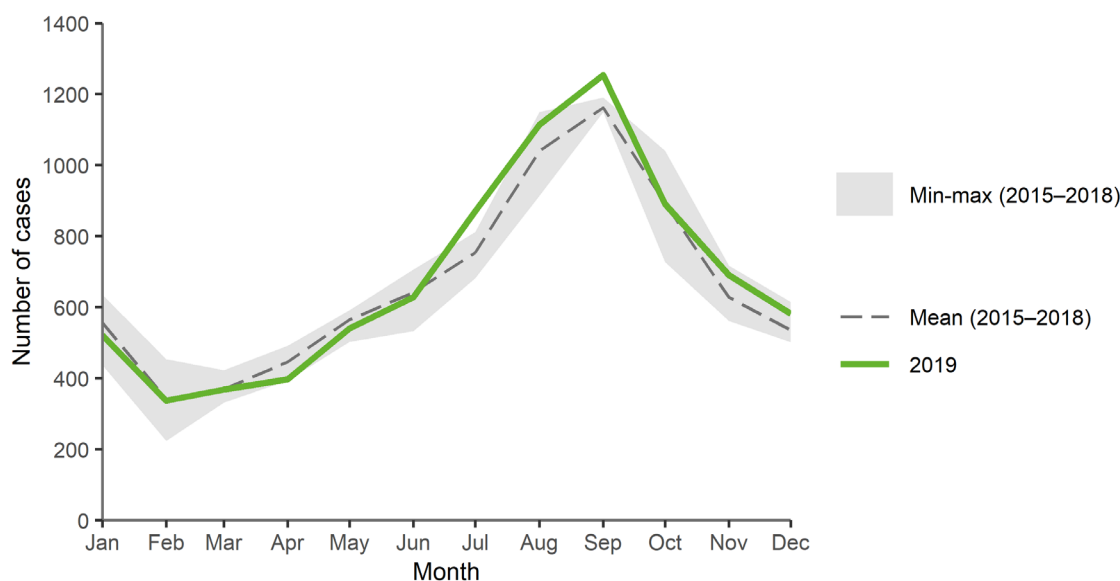
A marked seasonal trend was observed across the 25 countries consistently reporting malaria from 2015 to 2019, with cases increasing during and immediately after the summer holiday months (July–September). Compared with the seasonal trends during the period 2015–2018, the peak was higher in 2019 (Figure 2).

Figure 2. Distribution of confirmed malaria cases by month, EU/EEA, 2015–2019



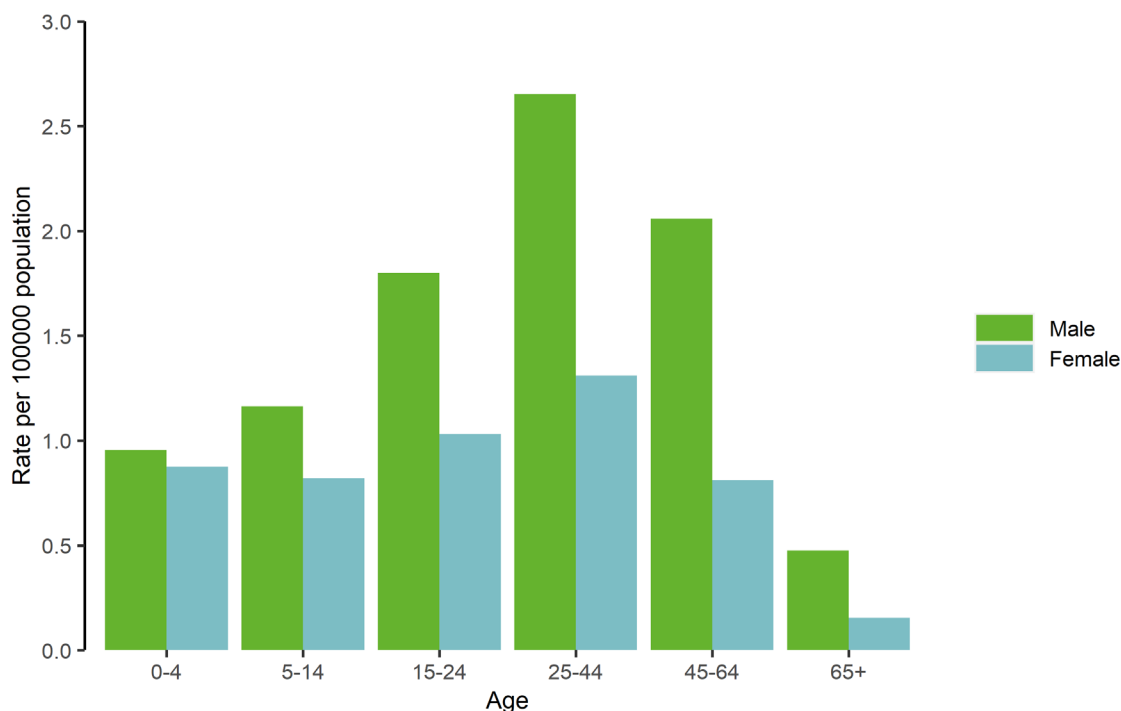
Source: Country reports from Austria, Cyprus, Czechia, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, the United Kingdom.

Figure 3. Distribution of confirmed malaria cases by month, EU/EEA, 2019 and 2015–2018



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

In 2019, the overall rate of confirmed malaria cases was higher among men than women (1.8 and 0.8 cases per 100 000 population respectively; male-to-female ratio: 1.8:1). In both men and women, the notification rate was highest in the age group 25–44 years (2.7 and 1.3 cases per 100 000 population, respectively), followed by 45–64 years for men (2.1) and 15–24 years for women (1.0) (Figure 4).

Figure 4. Distribution of confirmed malaria rate per 100 000 population, by age and gender, EU/EEA, 2019

Discussion

The incidence rate of malaria is estimated to have decreased by 27% globally between 2010 and 2019, but the declining trend slowed down after 2015, decreasing by less than 2% between 2015 and 2019.

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 (96%), the Eastern Mediterranean (73%), the Western Pacific (68%), and South-East Asia (53%), while *P. vivax* is the dominant malaria species in the Americas (76%) [1]. The reduction in global malaria incidence between 2010 and 2019 has not resulted in a significant decline in the notification rate observed in the EU/EEA.

Nearly all malaria cases reported by EU/EEA countries for 2019 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 and the United Kingdom are linked to travel routes from West Africa [8]. Seasonality 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]. 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 of sporadic autochthonous malaria cases (nine) were reported in the EU/EEA in 2019, but no sustained transmission has been reported [5-7].

Public health implications

Awareness of malaria among clinicians and travellers, particularly among people visiting friends and relatives in malaria-endemic countries, should remain high. 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 2019 [10]). 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. Because of 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.

Vigilance should remain high with regard to malaria transmission through substances of human origin (e.g. blood products or organ transplants). Healthcare providers should be aware that hospital transmission of malaria is rare but possible, irrespective of the *Plasmodium* species involved. Therefore, clinicians should consider the possibility of hospital-acquired malaria in hospitalised or recently discharged patients who develop an unexplained fever or malaria-like clinical syndrome, especially if their hospital admission coincided with that of another patient admitted with malaria [11].

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

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