

Dengue

Annual Epidemiological Report for 2021

Key facts

- For 2021, 27 EU/EEA countries reported 428 cases of dengue, of which 410 (96%) were confirmed.
- Dengue cases decreased compared to previous years.
- The EU/EEA notification rate in 2021 was 0.1 cases per 100 000 population.
- The highest rates in both men and women were among those aged 25–44 years.
- The number of cases peaked in June.
- Of the cases with known probable country of infection, 48% were imported from Africa, mostly from Réunion.
- Three autochthonous dengue cases were reported from the EU/EEA¹, by France.

Introduction

Dengue is a mosquito-borne disease caused by viruses of the *Flaviviridae* family. The disease is widespread in tropical and subtropical regions. While most clinical cases present a febrile illness, severe forms have been reported, in some instances leading to the death of the patient.

Methods

This report is based on data for 2021 retrieved from The European Surveillance System (TESSy) on 25 October 2022. 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 [1].

An overview of the national surveillance systems is available online [2].

A subset of the data used for this report is available through ECDC's online *Surveillance Atlas of Infectious Diseases* [3].

For 2021, 27 EU/EEA countries reported data on dengue. No data were reported by Bulgaria, Cyprus, and Denmark. In addition, as the United Kingdom (UK) left the EU on 31 January 2020, the country was not included in the data call and consequently did not provide data. All countries reported case-based data, except for Belgium. Eleven countries (Croatia, Czechia, Iceland, Latvia, Liechtenstein, Luxembourg, Malta, the Netherlands, Romania, Slovakia, and Slovenia) reported no cases.

¹ For the purposes of this document, the EU/EEA excludes the outermost regions and overseas countries and territories.

Twelve countries (Belgium, Estonia, Greece, Iceland, Italy, Lithuania, Luxembourg, Malta, Poland, Romania, Slovakia, and Spain) referred to the 2018 dengue EU case definition, nine countries referred to the EU generic case definition for viral haemorrhagic fevers, one country did not specify which case definition was used (France), and five countries used other case definitions (Czechia, Germany, Liechtenstein, the Netherlands, and Portugal).

All reporting countries except for the Netherlands had a comprehensive surveillance system. Reporting was compulsory in all countries.

Epidemiology

For 2021, 27 countries reported 428 cases of dengue, of which 410 (96%) were confirmed (Table 1). This was the lowest number of cases reported at the EU/EEA level since 2017, even excluding the UK (which was among the three countries with the highest number of cases reported from 2017 to 2019 and stopped providing data in 2020 due to no longer being an EU Member State).

From 2017 to 2019, the number of reported cases (excluding those from the UK) ranged from 1 563 in 2017 to 3 743 in 2019, with no discernible trend (Figure 2). The number of dengue cases has decreased from 2020 onwards. A 79% reduction in the number of dengue cases was observed in 2021 compared with 2020. This decline was observed in all EU/EEA countries except Portugal, and was particularly pronounced in Austria, France, Germany, Greece, Italy, Spain, and Sweden.

In 2021, the highest proportion of cases (54%) in the EU/EEA was reported by France, followed by Germany (14%), and Spain (11%) (Table 1, Figure 1).

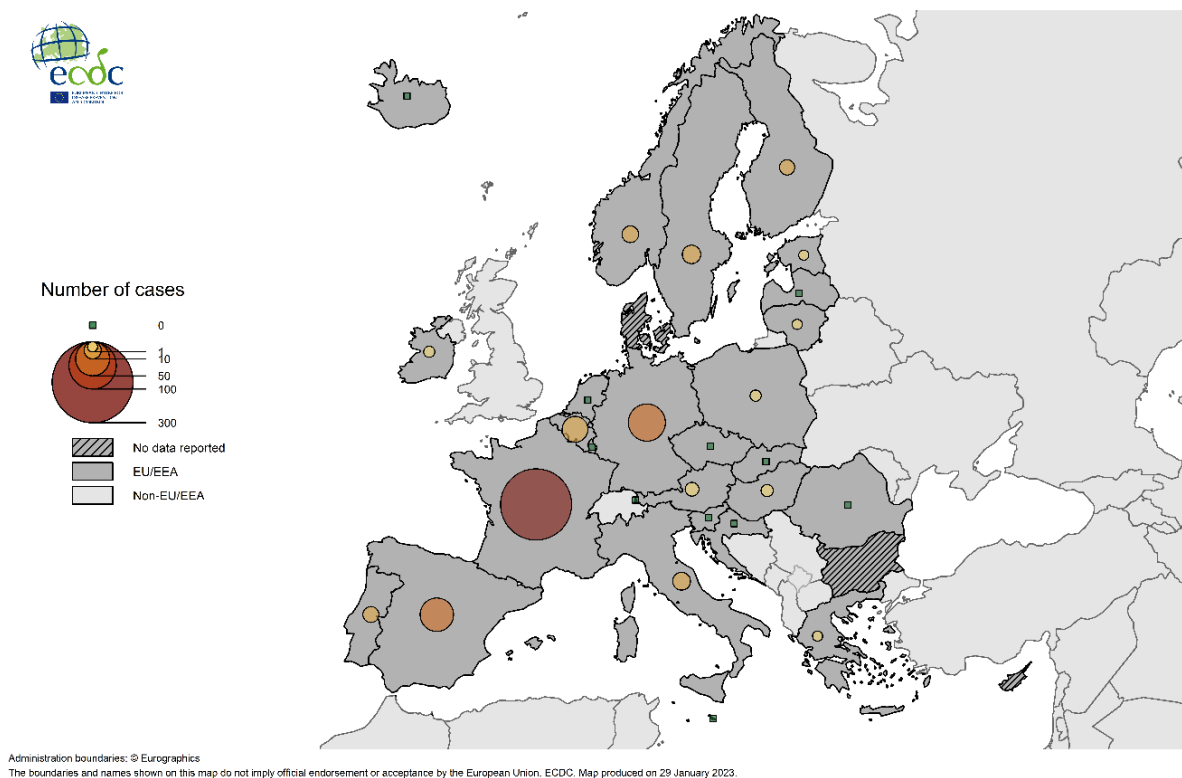
The EU/EEA notification rate was 0.1 cases per 100 000 population; the country-specific rate was highest in France (0.3 cases per 100 000 population).

Table 1. Number of dengue cases and rates per 100 000 population by country and year, EU/EEA, 2017–2021

Country	2017		2018		2019		2020		2021		
	Number	Rate	Number	Rate	Number	Rate	Number	Rate	Number	Rate	ASR
Austria	85	1.0	85	1.0	142	1.6	38	0.4	5	0.1	0.1
Belgium	77	0.7	101	0.9	202	1.8	80	0.7	27	0.2	0.2
Bulgaria	ND	NR	ND	NR	ND	NR	ND	NR	ND	NR	NR
Croatia	0	0.0	2	0.0	4	0.1	4	0.1	0	0.0	0.0
Cyprus	ND	NR	ND	NR	ND	NR	ND	NR	ND	NR	NR
Czechia	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0.0
Denmark	ND	NR	ND	NR	ND	NR	ND	NR	ND	NR	NR
Estonia	8	0.6	6	0.5	6	0.5	3	0.2	1	0.1	0.1
Finland	25	0.5	56	1.0	81	1.5	21	0.4	7	0.1	0.1
France	266	0.4	331	0.5	904	1.3	1 362	2.0	231	0.3	0.4
Germany	635	0.8	614	0.7	1178	1.4	202	0.2	60	0.1	0.1
Greece	1	0.0	2	0.0	10	0.1	1	0.0	1	0.0	0.0
Hungary	17	0.2	14	0.1	44	0.5	15	0.2	3	0.0	0.0
Iceland	1	0.3	1	0.3	4	1.1	0	0.0	0	0.0	0.0
Ireland	10	0.2	17	0.4	18	0.4	3	0.1	2	0.0	0.0
Italy	95	0.2	108	0.2	232	0.4	45	0.1	11	0.0	0.0
Latvia	13	0.7	12	0.6	11	0.6	5	0.3	0	0.0	0.0
Liechtenstein	ND	NR	ND	NR	ND	NR	ND	NR	0	0.0	0.0
Lithuania	4	0.1	8	0.3	9	0.3	5	0.2	1	0.0	0.0
Luxembourg	0	0.0	1	0.2	1	0.2	1	0.2	0	0.0	0.0
Malta	3	0.7	1	0.2	2	0.4	1	0.2	0	0.0	0.0
Netherlands	0	NR	0	NR	0	NR	3	NR	0	NR	NR
Norway	35	0.7	49	0.9	102	1.9	27	0.5	9	0.2	0.2
Poland	29	0.1	30	0.1	55	0.1	9	0.0	2	0.0	0.0
Portugal	11	0.1	14	0.1	30	0.3	6	0.1	8	0.1	0.1
Romania	7	0.0	4	0.0	15	0.1	3	0.0	0	0.0	0.0
Slovakia	2	0.0	7	0.1	6	0.1	1	0.0	0	0.0	0.0
Slovenia	5	0.2	8	0.4	21	1.0	1	0.0	0	0.0	0.0
Spain	128	0.3	205	0.4	431	0.9	155	0.3	48	0.1	0.1
Sweden	106	1.1	106	1.0	235	2.3	58	0.6	12	0.1	0.1
United Kingdom	465	0.7	432	0.7	827	1.2	ND	NR	ND	NR	NR
EU/EEA	2 028	0.4	2 214	0.5	4 570	0.9	2 049	0.5	428	0.1	0.1

Source: Country reports. ASR: age-standardised rate.
ND: no data reported. NR: no rate calculated.

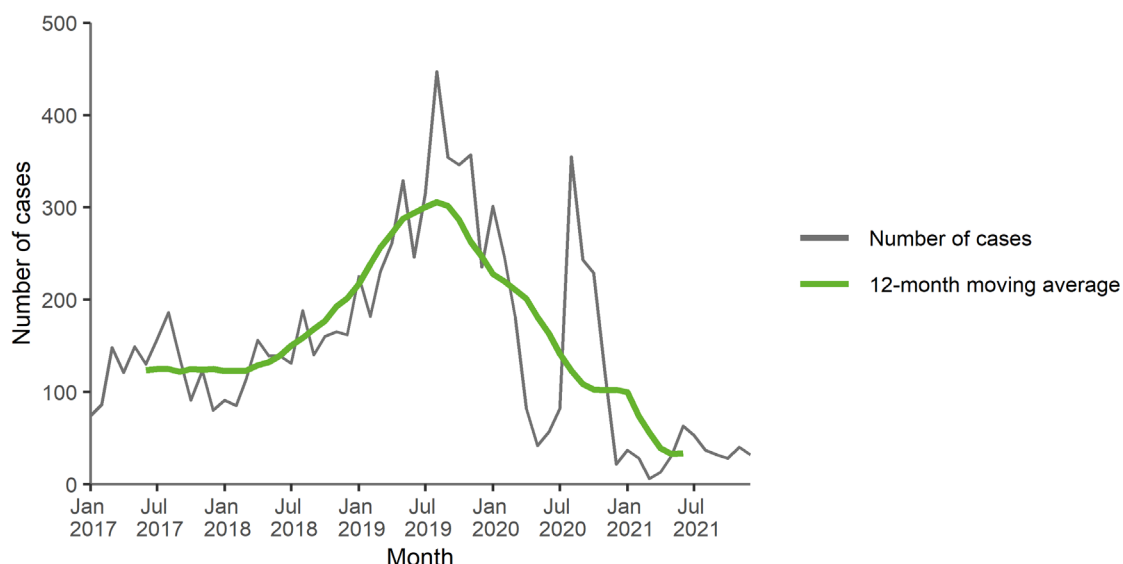
Figure 1. Number of dengue cases by country, EU/EEA, 2021



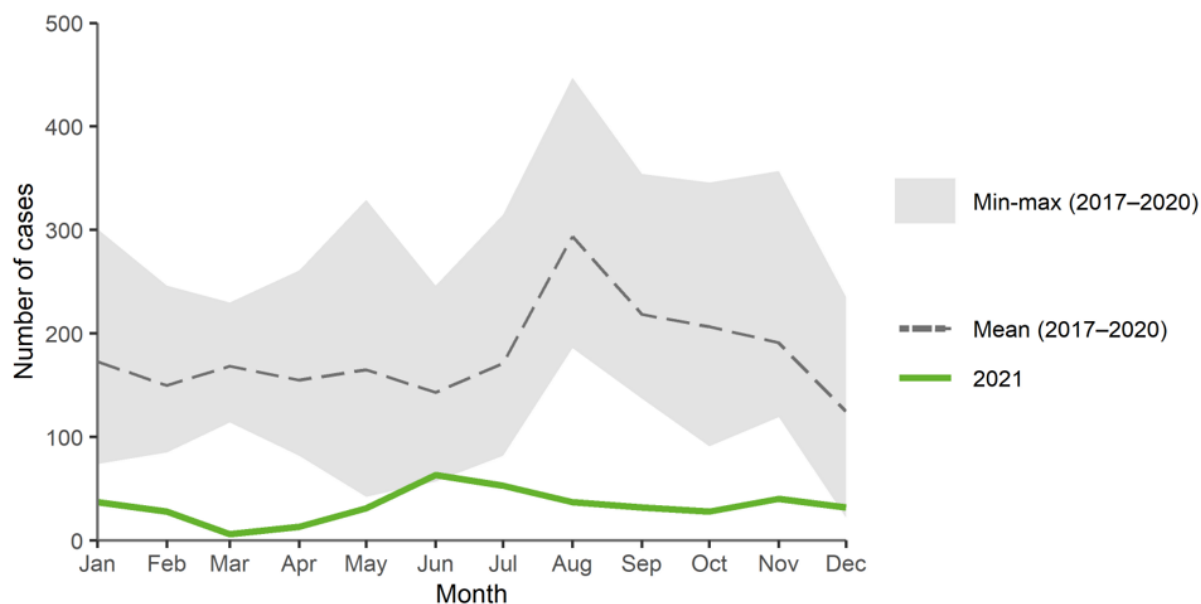
Source: Country reports from Austria, Belgium, Croatia, Czechia, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Liechtenstein, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, and Sweden.

Information about the month of onset, diagnosis, and/or reporting was available for 401 cases. A large proportion of these cases were observed in the summer, peaking in June (n=63) (Figures 2 and 3). When compared with previous years, the monthly numbers of cases were below the expected range throughout 2021 (Figure 3).

Figure 2. Number of dengue cases by month, EU/EEA, 2017–2021

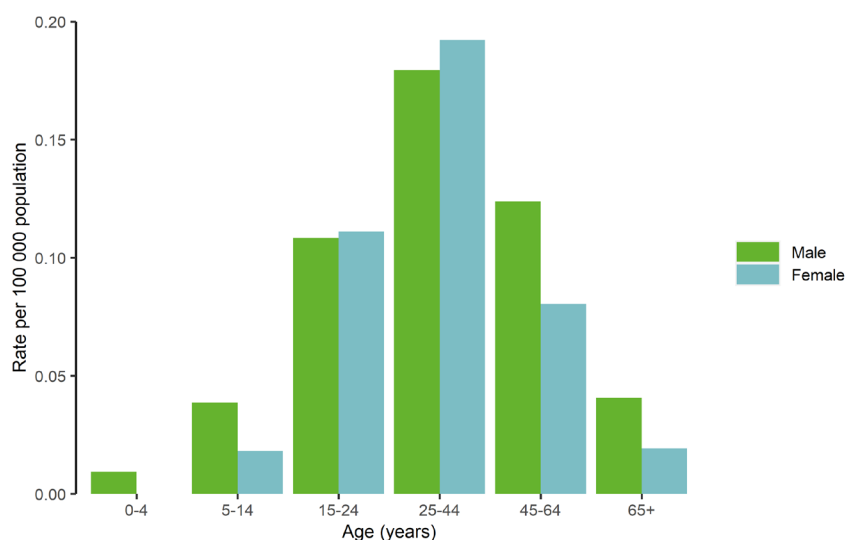


Source: Country reports from Austria, Czechia, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, and Sweden. Only countries with consistent reporting were included in seasonality time series.

Figure 3. Number of dengue cases by month, EU/EEA, 2021 and 2017–2020

Source: Country reports from Austria, Czechia, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, and Sweden. Only countries with consistent reporting were included in seasonality time series.

Information on gender and age was available for 425 cases and 428 cases, respectively. The male-to-female ratio was 1.2:1. The majority ($n=336$; 79%) of cases were aged 25–64 years. The highest rates were observed in the age group 25–44 years, with 0.2 cases per 100 000 population (Figure 4). A relatively similar age distribution was observed for both males and females. Dengue rates are lower among females across all age groups, except in individuals aged 15–44 years, than for males the same age.

Figure 4. Number of dengue rate per 100 000 population, by age and gender, EU/EEA, 2021

France ($n=3$) was the only country that reported autochthonous dengue cases in 2021. The vast majority of the dengue cases reported at the EU/EEA level were therefore related to travel to dengue-endemic countries. Information on the probable country of infection was available for 376 travel-related cases, who acquired their infections in more than 45 different probable countries of infection. The majority ($n=181$; 48%) of these cases were likely infected in Africa, principally in the French overseas department of Réunion ($n=115$; 31%), followed by the Americas ($n=121$, 32%), with most cases being infected in Guadeloupe ($n=31$, 8.2%), Cuba ($n=16$, 4.3%), and Martinique ($n=15$, 4.0%). France reported one non-indigenous dengue case, infected in Paris, in a patient who had received an organ donation from Réunion.

Outbreaks and other threats

Since 2019, Réunion has been facing a large epidemic of dengue with seasonal epidemic waves. In 2019 and 2020 there were 18 217 and 16 414 confirmed cases, respectively [4]. In 2021, as of 17 December 2021, French authorities reported 29 830 confirmed dengue cases in Réunion [5]. There was a significant increase in the proportion of severe cases among individuals hospitalised with dengue in 2021 (27%) compared to 2019 (17%) and 2020 (16%) [4]. Among confirmed cases of dengue, 33 deaths were registered, but the proportion of deaths among confirmed cases remained stable compared to the previous years [4]. In 2021, dengue virus serotype 1 (DENV-1) was the only serotype identified in Réunion [6].

Discussion

The overall decrease in number of cases is possibly explained by the decrease in travel due to the COVID-19 restrictions implemented globally. In 2021, we observed a decrease in the number of dengue cases reported globally, similar to that observed in 2020 [7, 8]. Although this is consistent with a growing body of evidence suggesting a strong association between COVID-19-related societal disruption and reduced dengue risk, as well as several studies suggesting dengue is spread through human movement, with transmission occurring in shared areas outside the home, caution is needed when interpreting these results [9-11]. It is unclear how the COVID-19 pandemic has influenced dengue diagnostic capacity and surveillance in EU countries, and as mild symptoms of dengue can be confused with other illnesses that cause fever, aches, and pain, such as COVID-19, it is possible that dengue disease detection was limited during this period [12].

From 2020 onwards, the UK did not report any data through TESSy. As the UK was one of the EU countries reporting the highest number of cases in previous years, comparing the total number of cases reported in the EU/EEA and related rates of infection should be done with caution.

The age and gender distribution of the dengue cases reported in the EU/EEA most probably reflect the demographic characteristics of travellers rather than other risk factors.

The increasing number of reported dengue cases from March onwards, peaking in June, is expected, reflecting the seasonality of travel as increasing trends in mobility were observed in EU/EEA region after pandemic restrictions were eased, but also reflecting the seasonal transmission pattern in the probable countries of infection [13].

Within the EU/EEA, in 2021 three autochthonous cases of dengue were reported in France. Vector-borne transmission events of dengue virus within the EU/EEA are expected in areas where *Aedes albopictus* is established and when environmental conditions allow sufficient vector capacity (roughly from early summer to mid-autumn) [14]. Vector-borne transmission of dengue virus has regularly occurred within mainland EU since 2010 but all these events have remained of limited size so far [15]. In 2021, the vast majority of the dengue cases reported at the EU/EEA level were related to travel to dengue-endemic countries in Africa (48%) and in the Americas (32%). The increase in the proportion of dengue cases reported in Africa, was driven by an epidemic in the French overseas department of Réunion, with an unprecedented number of cases compared to previous years [16]. Although, the majority of EU/EEA travel-related cases infected in the Americas were associated with French overseas territories and Cuba, the most affected countries in this region were Brazil, Colombia, and Peru [17]. Similar to the EU/EEA region, the number of dengue cases in the Americas also decreased in 2021 compared to previous years [17]. One non-indigenous dengue case reported by France occurred in a patient from Paris who had received an organ donation from Réunion [18]. Although non-vectorial forms of dengue transmission are rare, there have been reports of dengue transmission through organ transplantation [19]. Currently, there is not a universal recommendation for dengue screening of donors in transplantation guidelines, but this risk should be considered in endemic areas.

Public health implications

Vigilance regarding travel-related cases of dengue and other *Aedes*-borne infections remains essential. Public health authorities in the EU/EEA should consider raising awareness among clinicians and travel clinic specialists about the risk related to such diseases, especially when and where vector-borne secondary transmission may take place. The detection of an autochthonous case in the EU/EEA should trigger epidemiological and entomological investigations to assess the size of the transmission area and the potential for onward transmission and guide vector control measures.

To date, *Aedes albopictus* is the main competent vector for dengue virus in mainland Europe, and is largely established throughout mainland Europe [20]. *Aedes aegypti*, the primary vector for dengue virus transmission globally, is not established in the EU/EEA, but has recently established itself in Cyprus (with a still localised population) and is present around the Black Sea and in several EU overseas countries and territories (e.g. Aruba, French Polynesia) and outermost regions (e.g. Madeira, Martinique, Réunion). Further spread and subsequent

establishment of *Aedes aegypti* in mainland EU/EEA would increase the likelihood of autochthonous transmission events within the region, as well as the size of epidemics.

Transmission of dengue virus through transfusion of erythrocytes, platelets, and plasma [21-24], as well as through kidney, liver, and bone marrow transplantation, has been documented [25, 26]. As a result, measures to prevent dengue virus transmission via substances of human origin should be implemented for travellers returning from affected areas and in response to autochthonous transmission within the EU/EEA. These measures may include donor deferral, donor/donation screening, blood donation quarantine, post-donation information, and pathogen inactivation of plasma and platelets [27].

Two tetravalent (live, attenuated) dengue vaccines have been granted an authorisation by the European Medicines Agency (EMA) for use in the EU: Dengvaxia (in 2018) and Qdenga (in 2022) [28-30]. Dengvaxia can be given to people between six and 45 years old who live in endemic areas, and who have had a prior dengue virus infection (seropositive individuals). This vaccine is therefore not recommended for populations of mainland EU, but could be used in EU overseas countries and territories and EU outermost regions where dengue is endemic. Qdenga is indicated for the prevention of dengue disease in individuals from four years old.

Personal protective measures focus principally on protection against mosquito bites. *Aedes* mosquitoes have diurnal biting activities in both indoor and outdoor environments. Personal protection measures should therefore be applied all day long and especially during the hours of highest mosquito activity (mid-morning and late afternoon to twilight). Personal protective measures to reduce the risk of mosquito bites include the use of mosquito bed nets (preferably insecticide-treated nets), sleeping or resting in screened or air-conditioned rooms, the wearing of clothes that cover most of the body, and the use of mosquito repellent in accordance with the instructions indicated on the product label.

Travellers returning from dengue-endemic areas and residing in receptive areas of mainland Europe should continue applying personal protective measures after their return for a period of about two weeks. This is to avoid infecting local mosquitoes, which could result in autochthonous transmission within mainland Europe. It should be noted that asymptomatic individuals infected with dengue virus can be infectious and therefore further transmit the virus. In addition, local authorities may consider conducting preventive vector control measures around imported dengue cases in receptive areas.

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