

Dengue

Annual Epidemiological Report for 2020

Key facts

- For 2020, 26 EU/EEA countries reported 1 957 cases of dengue, of which 1 820 (93%) were confirmed.
- From 2016 to 2020, no obvious trend in the number of cases could be identified.
- The EU/EEA notification rate in 2020 was 0.5 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 January and in August.
- 79% of the cases with known probable country of infection were imported from the Americas, mostly from Martinique and Guadeloupe.
- Twenty-four autochthonous dengue cases were reported from the EU/EEA¹: 13 by France and 11 by Italy.

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 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 the 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].

¹ For the purposes of this document, the EU/EEA excludes the Outermost Regions and the Overseas Countries and Territories

For 2020, 26 EU/EEA countries reported data on dengue. No data were reported by Bulgaria, Cyprus, Denmark or Liechtenstein. 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. Czechia and Iceland reported zero cases.

Eight countries (Belgium, Greece, Italy, Lithuania, Malta, Poland, Romania, Spain) referred to the 2018 dengue case definition, 13 countries referred to the EU generic case definition for viral haemorrhagic fevers, one country did not specify which case definition was used (France), and four countries used other case definitions (Czechia, Germany, the Netherlands, Portugal).

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

Epidemiology

For 2020, 26 countries reported 1 957 cases of dengue, of which 1 820 (93%) were confirmed (Table 1). This was the lowest number of cases reported at the EU/EEA level since 2016. However, the UK, which was among the three countries with the highest number of cases reported from 2016 to 2019, did not provide data in 2020 due to no longer being an EU Member State.

From 2016 to 2020, the number of reported cases (excluding those from the UK) ranged from 1 563 in 2017 to 3 540 in 2019, with no discernible trend (Figure 2). A 45% decrease in number of cases was observed in 2020 compared with 2019 (excluding UK data). This decrease was particularly pronounced in Austria, Germany, Italy, Spain and Sweden. In contrast, France observed a large increase in number of cases compared to previous years.

In 2020, France reported the highest proportion of cases (70%), followed by Germany (10%) (Table 1, Figure 1).

The EU/EEA notification rate in 2020 was 0.5 cases per 100 000 population; the country-specific rate was highest in France (2.0 cases per 100 000 population).

Table 1. Number of dengue cases and rate 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	116	1.3	85	1.0	85	1.0	142	1.6	38	0.4	0.4
Belgium	114	1.0	77	0.7	101	0.9	202	1.8	80	0.7	0.7
Bulgaria	ND	NR	ND	NR	ND	NR	ND	NR	ND	NR	NR
Croatia	2	0.0	0	0.0	2	0.0	4	0.1	4	0.1	0.1
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	9	0.7	8	0.6	6	0.5	6	0.5	3	0.2	0.2
Finland	66	1.2	25	0.5	56	1.0	81	1.5	21	0.4	0.4
France	373	0.6	266	0.4	331	0.5	904	1.3	1 362	2.0	2.1
Germany	958	1.2	635	0.8	614	0.7	1 178	1.4	202	0.2	0.3
Greece	2	0.0	1	0.0	2	0.0	10	0.1	1	0.0	0.0
Hungary	24	0.2	17	0.2	14	0.1	44	0.5	15	0.2	0.2
Iceland	0	0.0	1	0.3	1	0.3	4	1.1	0	0.0	0.0
Ireland	18	0.4	10	0.2	17	0.4	18	0.4	3	0.1	0.1
Italy	106	0.2	95	0.2	108	0.2	232	0.4	45	0.1	0.1
Latvia	9	0.5	13	0.7	12	0.6	11	0.6	5	0.3	0.3
Liechtenstein	ND	NR	ND	NR	ND	NR	ND	NR	ND	NR	NR
Lithuania	4	0.1	4	0.1	8	0.3	9	0.3	5	0.2	NR
Luxembourg	1	0.2	0	0.0	1	0.2	1	0.2	1	0.2	0.2
Malta	1	0.2	3	0.7	1	0.2	2	0.4	1	0.2	0.2
Netherlands	6	NR	0	NR	0	NR	0	NR	3	NR	NR
Norway	64	1.2	35	0.7	49	0.9	102	1.9	27	0.5	0.5
Poland	41	0.1	29	0.1	30	0.1	55	0.1	9	0.0	0.0
Portugal	13	0.1	11	0.1	14	0.1	30	0.3	6	0.1	0.1
Romania	8	0.0	7	0.0	4	0.0	15	0.1	3	0.0	0.0
Slovakia	4	0.1	2	0.0	7	0.1	6	0.1	1	0.0	0.0
Slovenia	6	0.3	5	0.2	8	0.4	21	1.0	1	0.0	0.1
Spain	261	0.6	128	0.3	205	0.4	228	0.5	63	0.1	0.1
Sweden	225	2.3	106	1.1	106	1.0	235	2.3	58	0.6	0.6
UK	468	0.7	465	0.7	432	0.7	827	1.2	ND	NR	NR
EU/EEA	2 899	0.6	2 028	0.4	2 214	0.5	4 367	0.9	1 957	0.5	0.5

Source: Country reports

ASR: age-standardised rate

ND: no data reported

NR: no rate calculated

Data were not collected from the UK in 2020, as the country left the EU on 31 January 2020. Although the number of cases was provided, the ASR for Lithuania was not calculated because information on the sex of the cases was missing. Rates were not calculated for the Netherlands because the country does not have a comprehensive surveillance system.

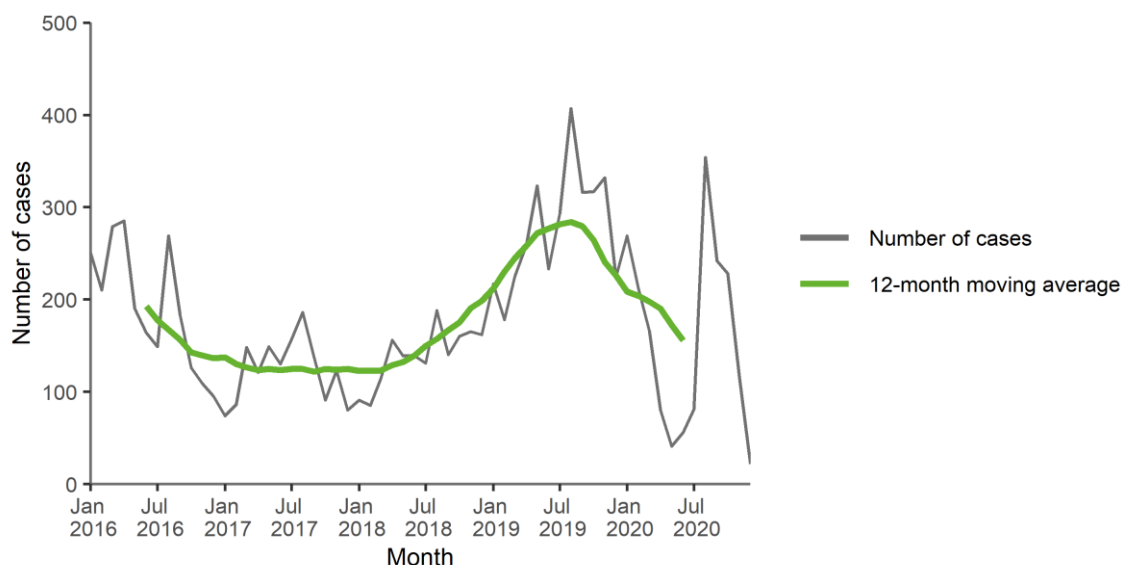
Figure 1. Distribution of dengue cases by country, EU/EEA, 2020



Source: Country reports from Austria, Belgium, Croatia, 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

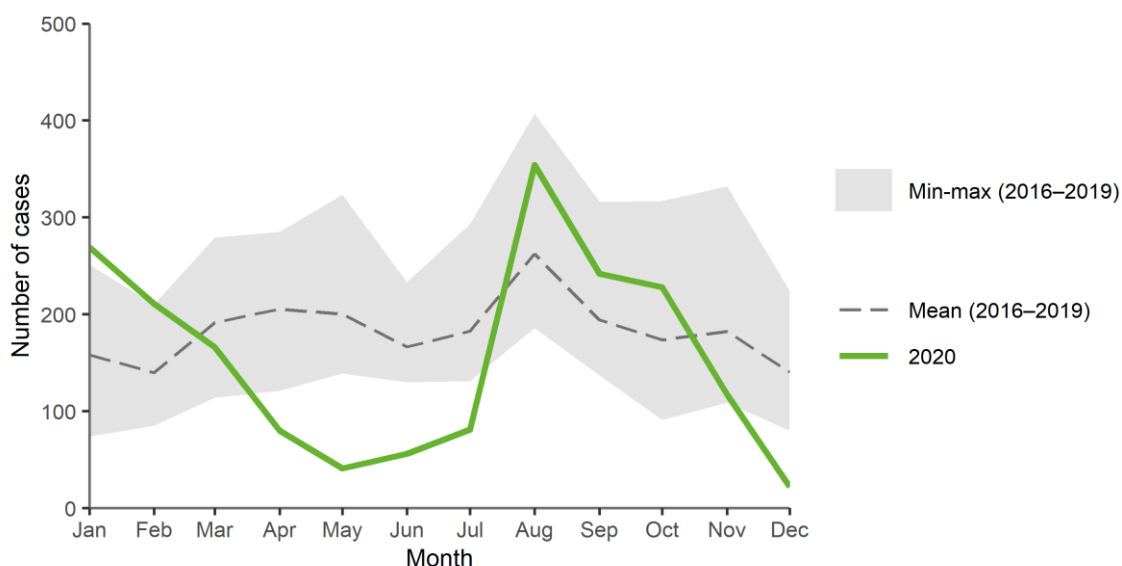
Information about the month of onset, diagnosis and/or reporting was available for 1 871 cases. A large proportion of these cases were observed in winter and late summer, with peaks in the number of cases in January (n = 271) and August (n = 354) (Figures 2 and 3). When compared with previous years, the monthly numbers of cases reported from April to July were below the expected range.

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



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

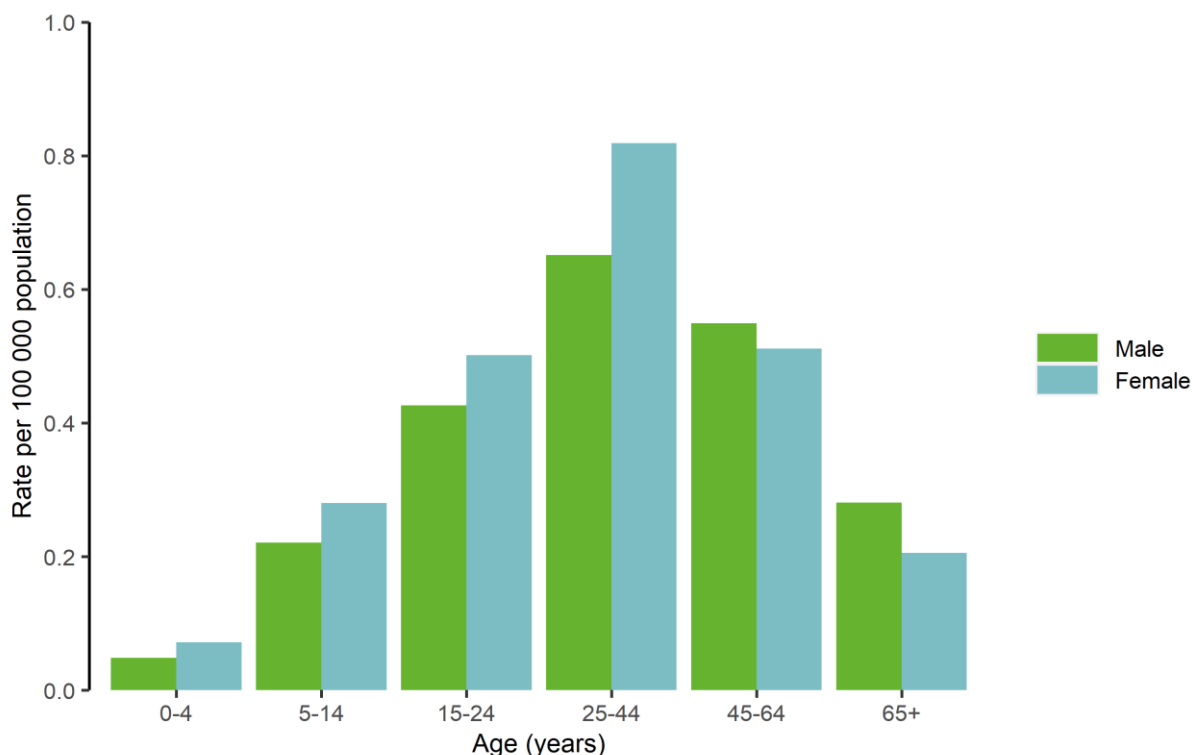
Figure 3. Distribution of dengue cases by month, EU/EEA, 2020 and 2016–2019



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

Information on sex and age was available for 1 956 cases and 1 950 cases, respectively. The male-to-female ratio was 0.9:1. The majority (n = 1 420; 73%) of cases were aged 25–64 years. The highest rates were observed in the age group 25–44 years, with 0.7 cases per 100 000 population (Figure 4). A relatively similar age distribution was observed for both males and females. The main difference was that the rate among females aged 45 years and older was lower than for males the same age, while it is the opposite for the younger age groups.

Figure 4. Distribution of dengue rate per 100 000 population, by age and sex, EU/EEA, 2020



France (n = 13) and Italy (n = 11) were the only two countries that reported autochthonous dengue cases in 2020. 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 1 688 travel-related cases, who acquired their infections in 68 different probable countries of infection. The majority (n = 1 327; 79%) of these cases were likely infected in the Americas, principally in the French overseas departments of Martinique (n = 716; 54%) and Guadeloupe (n = 386; 29%).

Discussion

The decrease in the number of travel-related cases of dengue in the EU/EEA in 2020 can largely be explained by the decrease in travel that occurred due to the restrictions implemented during the COVID-19 pandemic. Similarly, compared to previous years, the number of dengue cases reported in dengue-endemic countries was generally very low [4]. While it could be hypothesised that the level of virus circulation worldwide was low, it is likely that the COVID-19 pandemic limited diagnostic and surveillance capacities in EU/EEA countries and globally, thereby limiting the number of cases diagnosed and reported. Overall, 2020 data should be interpreted with caution, as it is unclear how the pandemic influenced diagnostic capacity and surveillance in EU/EEA countries or globally.

The vast majority of countries observed a decrease in the number of travel-related cases; however, France observed a major increase driven by epidemics in the French overseas departments of Martinique and Guadeloupe, as travel between the departments and mainland France remained possible during most of 2020.

As the UK left the EU on 31 January 2020, the country did not report any 2020 data through TESSy. Considering that the UK was among the countries reporting the highest numbers of cases in previous years, the total number of cases reported in the EU/EEA compared with related rates of infection should be interpreted with caution.

The age and sex distribution of the dengue cases reported in the EU/EEA most likely reflects the demographic characteristics of travellers rather than other risk factors.

The peak in the number of cases observed from January to February and the decrease in the number of cases observed in the spring were expected, as travel restrictions were established from March onwards in many countries. The peak in the number of cases observed in the winter and summer months reflects the seasonal transmission patterns in the probable countries of infection as well as the seasonality of travel.

Seven autochthonous vector-borne transmission events of dengue virus were reported within the EU/EEA, comprising a cumulative total of 24 cases. Six of these events occurred in France and one occurred in Italy, the latter being the first report of autochthonous dengue transmission in the country [5]. 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) [6]. Vector-borne transmission of dengue virus has occurred within mainland EU every year since 2010, but so far all of these events have remained limited size [5].

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, as well as to guide vector control measures.

To date, *Aedes albopictus* is the main competent vector for dengue virus in mainland EU/EEA and is largely established throughout the region. *Aedes aegypti*, the primary vector for dengue virus transmission globally, is not established in the EU/EEA, but the species is established around the Black Sea and in several EU Overseas Countries and Territories (e.g. Anguilla, Aruba, French Polynesia) and Outermost regions (e.g. Madeira, Martinique, La Réunion). The introduction and subsequent establishment of *Aedes aegypti* in mainland EU/EEA would certainly increase the likelihood of autochthonous transmission events within the region, as well as the size of the epidemics.

Transmission of dengue virus through transfusion of erythrocytes, platelets and plasma [7-10], as well as through kidney, liver and bone marrow transplantation, has been documented [11,12]. Therefore, 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 [13].

In 2018, the European Medicines Agency granted a marketing authorisation to the Dengvaxia vaccine, which is a tetravalent vaccine (live, attenuated) for the prevention of dengue [14]. The vaccine can be given to people who are from 9 to 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/EEA, but could be used in EU Overseas Countries and Territories and EU Outermost Regions where dengue is endemic.

Personal protective measures focus principally on protection against mosquito bites. *Aedes* mosquitoes have diurnal biting activities in both indoor and outdoor environments. Personal protective 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: using mosquito bed nets (preferably insecticide-treated nets), sleeping or resting in screened or air-conditioned rooms, wearing clothes that cover most of the body, and using mosquito repellent in accordance with the instructions indicated on the product label.

Travellers that visit dengue-endemic areas and reside in receptive areas of mainland EU/EEA should continue to apply 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 EU/EEA. 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.

References

1. European Centre for Disease Prevention and Control (ECDC). Introduction to the Annual Epidemiological Report. Stockholm: ECDC; 2020. Available at: <https://ecdc.europa.eu/en/annual-epidemiological-reports/methods>
2. European Centre for Disease Prevention and Control (ECDC). Surveillance systems overview for 2020. Stockholm: ECDC; 2022. Available at: <https://www.ecdc.europa.eu/en/publications-data/surveillance-systems-overview-2020>
3. European Centre for Disease Prevention and Control (ECDC). Surveillance atlas of infectious diseases - Dengue data. Stockholm: ECDC. [Accessed: 3 Mar 2022]. Available at: <http://atlas.ecdc.europa.eu/public/index.aspx?Dataset=27&HealthTopic=16>
4. European Centre for Disease Prevention and Control (ECDC). Communicable disease threats report, week 51, 13-19 December 2020. Stockholm: ECDC; 2020. Available at: <https://www.ecdc.europa.eu/sites/default/files/documents/Communicable-disease-threats-report-19-dec-2020.pdf>
5. European Centre for Disease Prevention and Control (ECDC). Autochthonous transmission of dengue virus in EU/EEA, 2010-present. Stockholm: ECDC; 2022. Available at: <https://www.ecdc.europa.eu/en/all-topics-z/dengue/surveillance-and-disease-data/autochthonous-transmission-dengue-virus-eueea>
6. European Centre for Disease Prevention and Control (ECDC), European Food Safety Authority (EFSA). *Aedes albopictus* - current known distribution, October 2021. Stockholm: ECDC; 2021. Available at: <https://www.ecdc.europa.eu/en/publications-data/aedes-albopictus-current-known-distribution-october-2021>
7. Tambyah PA, Koay ES, Poon ML, Lin RV, Ong BK, Transfusion-Transmitted Dengue Infection Study Group. Dengue hemorrhagic fever transmitted by blood transfusion. *N Engl J Med*. 2008 Oct 2;359(14):1526-7. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/18832256>
8. Oh HB, Muthu V, Daruwalla ZJ, Lee SY, Koay ES, Tambyah PA. Bitten by a bug or a bag? Transfusion-transmitted dengue: a rare complication in the bleeding surgical patient. *Transfusion (Paris)*. 2015 Jul;55(7):1655-61. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/25728040>
9. Matos D, Tomashek KM, Perez-Padilla J, Munoz-Jordan J, Hunsperger E, Horiuchi K, et al. Probable and possible transfusion-transmitted dengue associated with NS1 antigen-negative but RNA confirmed-positive red blood cells. *Transfusion (Paris)*. 2016 Jan;56(1):215-22. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/26469514>
10. Levi JE, Nishiya A, Felix AC, Salles NA, Sampaio LR, Hangai F, et al. Real-time symptomatic case of transfusion-transmitted dengue. *Transfusion (Paris)*. 2015 May;55(5):961-4. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/25605570>
11. Rosso F, Sanz AM, Parra-Lara LG, Moncada PA, Velez JD, Caicedo LA. Dengue Virus Infection in Solid Organ Transplant Recipients: A Case Series and Literature Review. *Am J Trop Med Hyg*. 2019 Dec;101(6):1226-31. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/31628736>
12. Punzel M, Korukluoglu G, Caglayik DY, Menemenlioglu D, Bozdog SC, Tekgunduz E, et al. Dengue virus transmission by blood stem cell donor after travel to Sri Lanka; Germany, 2013. *Emerg Infect Dis*. 2014 Aug;20(8):1366-9. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/25062084>
13. European Directorate for the Quality of Medicines and Healthcare of the Council of Europe. Guide to the preparation, use and quality assurance of blood components, 20th edition. Strasbourg: EDQM; 2020. Available at: <https://www.edqm.eu/en/blood-guide>
14. European Medicines Agency. First vaccine for prevention of dengue. Amsterdam: EMA; 2018. Available at: <https://www.ema.europa.eu/en/news/first-vaccine-prevention-dengue>