

Dengue

Annual Epidemiological Report for 2018

Key facts

- For 2018, 27 countries reported 2 191 cases of dengue, of which 2 033 (92.8%) were confirmed.
- Fourteen autochthonous dengue cases were reported from continental Europe by France (n=8) and Spain (n=6).
- The EU/EEA notification rate in 2018 was 0.4 cases per 100 000 population.
- The highest rates in both men and women were in those aged 25–44 years.
- The number of cases peaked in November.
- Thirty-four percent of the cases with known probable country of infection were imported from Thailand.

Methods

This report is based on data for 2018 retrieved from The European Surveillance System (TESSy) on 10 September 2019. 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].

Twenty-seven EU/EEA countries reported data on dengue. All countries reported case-based data, except for Belgium. The Czech Republic and the Netherlands reported zero cases. No data were reported by Bulgaria, Cyprus, Denmark and Liechtenstein.

Reported data for dengue were heterogeneous as no specific case definition for dengue was available until 2018. One country (Romania) referred to the 2018 dengue case definition, 17 countries referred to the EU generic case definition for viral haemorrhagic fevers, three countries did not specify which case definition was used (Belgium, Finland and France), and six countries used other case definitions (the Czech Republic, Germany, the Netherlands, Poland, Portugal and the United Kingdom).

All reporting countries except for the Netherlands had a comprehensive surveillance system. Reporting was compulsory in all countries, except for the United Kingdom where it was voluntary.

Suggested citation: European Centre for Disease Prevention and Control. Dengue. In: ECDC. Annual epidemiological report for 2018. Stockholm: ECDC; 2019.

Stockholm, December 2019

© European Centre for Disease Prevention and Control, 2019. Reproduction is authorised, provided the source is acknowledged.

Epidemiology

For 2018, 27 countries reported 2 191 cases of dengue, of which 2 033 (92.8%) were confirmed (Table 1). These numbers are comparable with 2017. Germany reported the highest proportion of cases (28%), followed by the United Kingdom (20%) and France (15%) (Table 1, Figure 1). The majority of the cases were travel-related. Fourteen autochthonous cases were reported in France (n=8) and Spain (n=6).

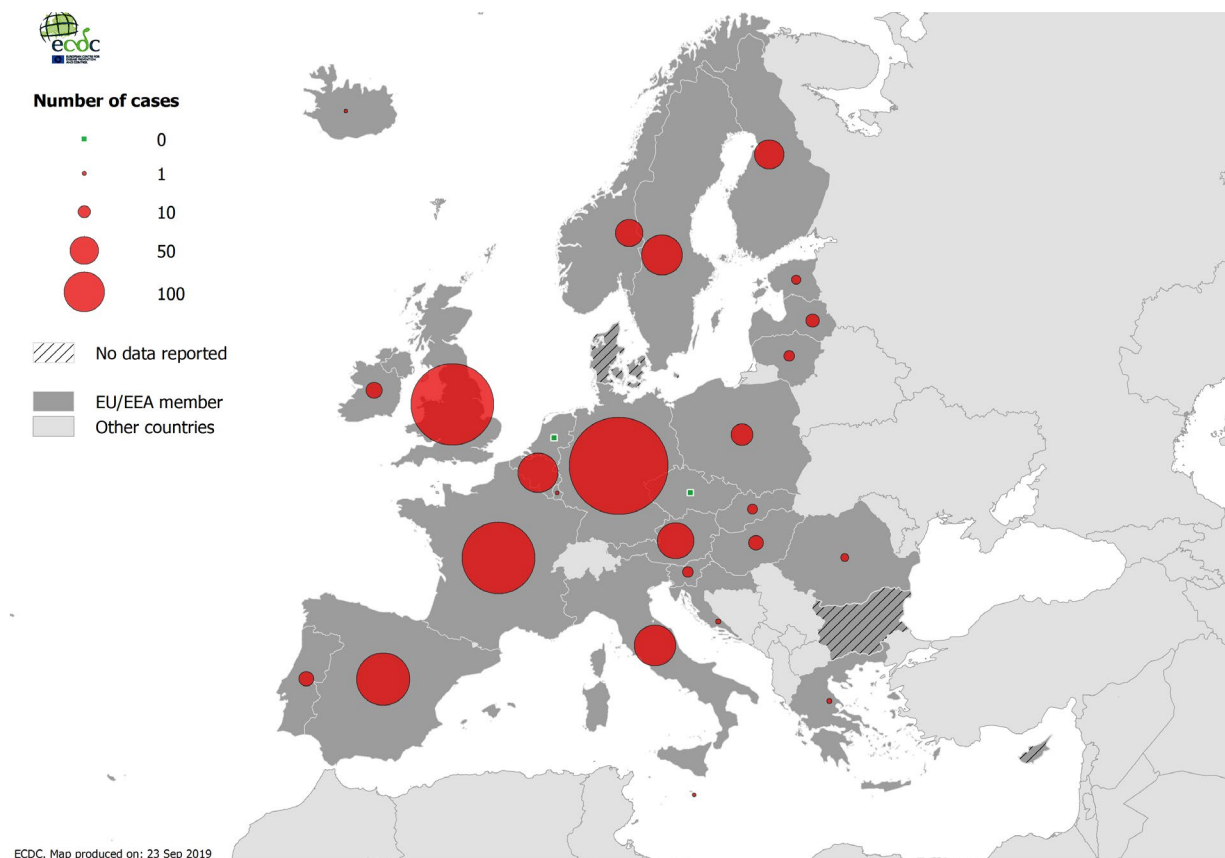
The EU/EEA notification rate in 2018 was 0.4 cases per 100 000 population, similar to previous years. Country-specific rates were highest in Austria, Finland and Sweden.

Table 1. Distribution of dengue cases and rates per 100 000 population by country and year, EU/EEA, 2014–2018

Country	2014		2015		2016		2017		2018			
	Reported cases	Rate	Reported cases	Rate	Reported cases	Rate	Reported cases	Rate	Reported cases	Rate	ASR	Confirmed cases
Austria	91	1.1	103	1.2	116	1.3	85	1.0	85	1.0	1.0	85
Belgium	110	1.0	108	1.0	114	1.0	77	0.7	101	0.9	0.9	101
Bulgaria	.	.	.	.	.	.	.	.	.	.	.	.
Croatia	2	0.0	.	.	2	0.0	0	0.0	2	0.0	0.1	2
Cyprus	.	.	.	.	.	.	.	.	.	.	.	.
Czech Republic	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0.0	0
Denmark	.	.	.	.	.	.	.	.	.	.	.	.
Estonia	9	0.7	12	0.9	9	0.7	8	0.6	6	0.5	0.5	6
Finland	38	0.7	54	1.0	66	1.2	25	0.5	56	1.0	1.1	56
France	212	0.3	167	0.3	297	0.4	264	0.4	333	0.5	0.5	296
Germany	626	0.8	722	0.9	958	1.2	635	0.8	613	0.7	0.8	613
Greece	4	0.0	2	0.0	2	0.0	1	0.0	2	0.0	0.0	2
Hungary	6	0.1	12	0.1	24	0.2	17	0.2	14	0.1	0.1	6
Iceland	0	0.0	0	0.0	0	0.0	1	0.3	1	0.3	0.3	1
Ireland	21	0.5	8	0.2	18	0.4	10	0.2	17	0.4	0.3	17
Italy	79	0.1	103	0.2	106	0.2	95	0.2	108	0.2	0.2	108
Latvia	1	0.0	4	0.2	9	0.5	13	0.7	12	0.6	0.7	12
Liechtenstein	.	.	.	.	.	.	.	.	.	.	.	.
Lithuania	3	0.1	9	0.3	4	0.1	4	0.1	8	0.3	0.3	2
Luxembourg	0	0.0	0	0.0	1	0.2	0	0.0	1	0.2	0.2	1
Malta	0	0.0	1	0.2	1	0.2	3	0.7	1	0.2	0.2	1
Netherlands	3	-	18	-	6	-	0	-	0	-	-	0
Norway	73	1.4	98	1.9	64	1.2	35	0.7	49	0.9	1.0	49
Poland	15	0.0	12	0.0	41	0.1	29	0.1	30	0.1	0.1	19
Portugal	.	.	14	0.1	13	0.1	11	0.1	14	0.1	0.1	14
Romania	6	0.0	7	0.0	8	0.0	7	0.0	4	0.0	0.0	4
Slovakia	0	0.0	2	0.0	4	0.1	2	0.0	7	0.1	0.1	7
Slovenia	2	0.1	3	0.1	6	0.3	5	0.2	8	0.4	0.4	8
Spain	0	0.0	168	0.4	261	0.6	128	0.3	181	0.4	0.4	151
Sweden	119	1.2	159	1.6	225	2.3	106	1.1	106	1.0	1.1	106
United Kingdom	376	0.6	423	0.7	468	0.7	465	0.7	432	0.7	0.7	366
EU/EEA	1796	0.4	2209	0.5	2823	0.6	2026	0.4	2191	0.4	0.5	2033

∴ no data reported; ∴ no rate calculated. ASR=age-standardised rate.

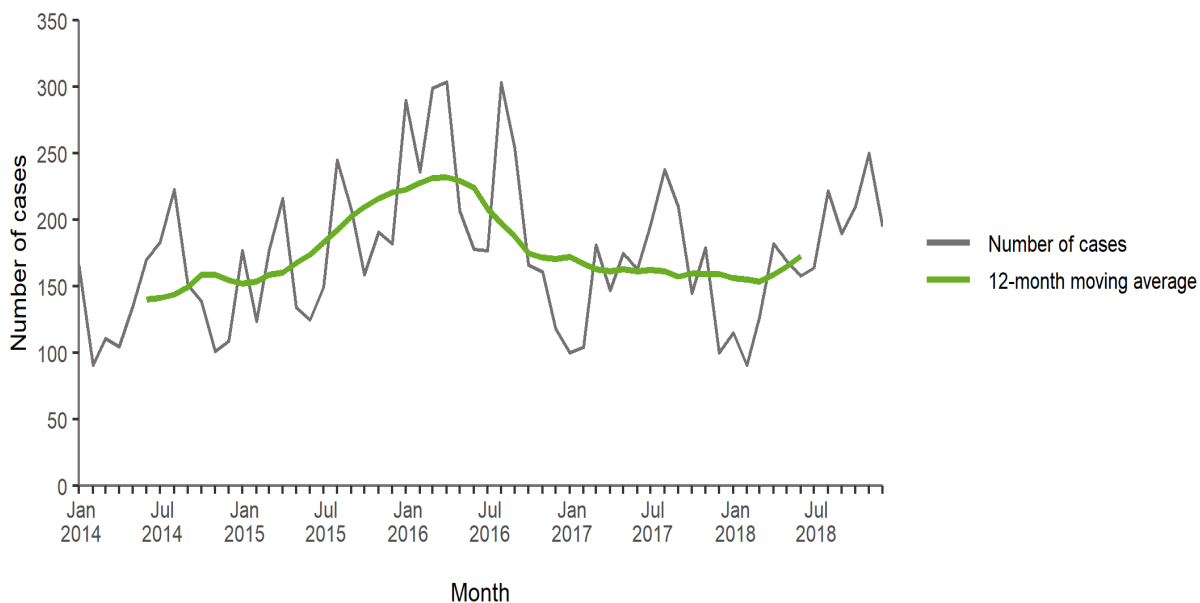
Figure 1. Distribution of dengue cases by country, EU/EEA, 2018



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

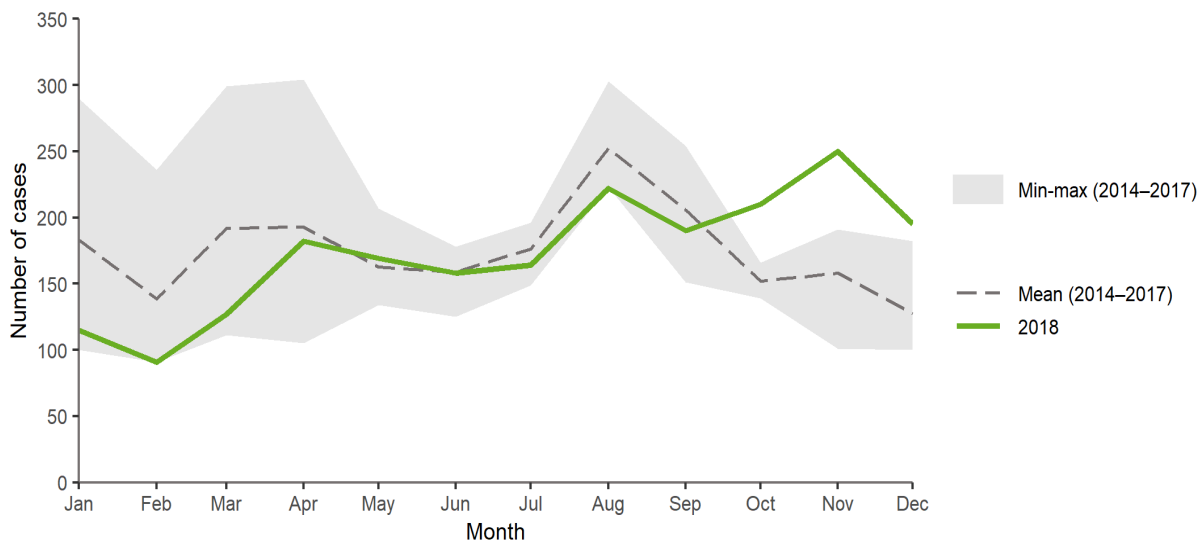
The numbers of dengue cases with sufficiently detailed information on time of infection, diagnosis or reporting fluctuated during the year. A high number of cases were observed between August and December (n=1071; 51%). The highest monthly numbers of cases were observed in November (n=251; 12%) and in August (n=223; 11%). Compared to previous years, the number of cases in November was unusually high (Figures 2, 3).

Figure 2. Distribution of dengue cases by month, EU/EEA, 2014–2018



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

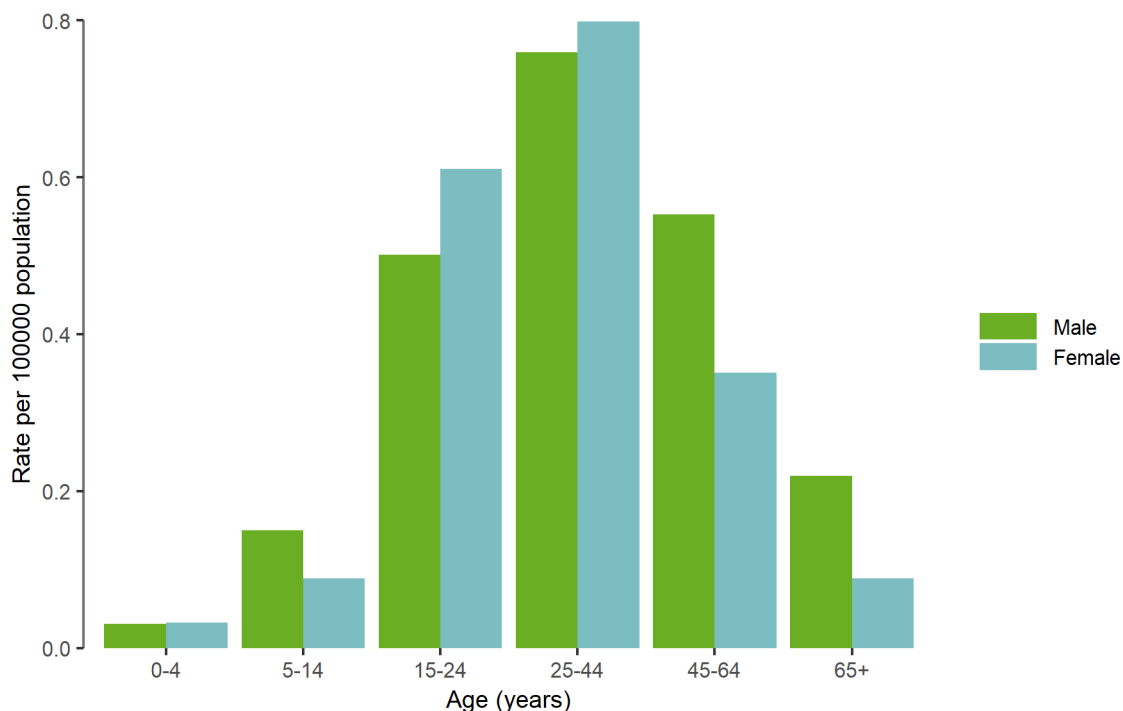
Figure 3. Distribution of dengue cases by month, EU/EEA, 2018 and 2014–2017



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

In 2018, the male-to-female ratio was 1.1:1. The majority (n=1 038, 47%) of the cases were 25–44 years of age. The highest rates were observed in the age groups 25–44 years and 15–24 years with 0.8 and 0.6 cases per 100 000 population, respectively (Figure 4).

Figure 4. Distribution of dengue cases per 100 000 population, by age and gender, EU/EEA, 2018



In 2018, both France (n=8) and Spain (n=6) reported autochthonous dengue cases. The other cases were travel-related. In 2018, information on the probable country of infection was available for 1 705 travel-related cases, who acquired their infection in 86 different probable countries of infection. The majority (77.4%) of these cases were probably infected in Asia including Thailand (34.5%), India (14.3%), the Maldives (5.5%), Indonesia (4.5%), Cambodia (3.6%), Sri Lanka (3.3%) and the Philippines (3.1%).

Outbreaks and other threats

Six unrelated autochthonous dengue events were reported in continental EU/EEA in 2018; three in France and three in Spain [4,5].

Discussion

The majority of travel-related dengue cases in 2018 were imported from Asia, reflecting the dengue situation in tropical regions where the disease is endemic. For instance, compared with 2017, Thailand reported a 50% increase (n=54 482), the Philippines observed a ten-fold increase (n=199 271) and Cambodia experienced a four-fold increase (n=9 885) in 2018 [6].

In the Americas, the total number of dengue cases in 2018 (n = 560 586) was also higher than the total reported in 2017 but lower than the average for the previous 11 years (2006–2016) [7]. Brazil reported almost half of the cases (n=266 000), followed by Mexico (n=79 000), Nicaragua (n=59 000) and Colombia (n=45 000). The risk of dengue outbreaks and severe dengue in the Americas is increasing as the number of countries with simultaneous co-circulation of two or more dengue virus serotypes has increased in the past 20 years [7,8].

The age and gender distribution of the dengue cases reported in the EU/EEA most probably reflects the demographic characteristics of travellers rather than other risk factors. The peak in the number of cases observed in the autumn most probably reflects an increased transmission of the virus in Asia due to climatic conditions favourable to vector activity during this period. In previous years, the seasonality in case occurrence more closely reflected holiday seasons, with most cases occurring in the summer.

Locally-acquired dengue cases were previously documented in southern France in 2010, 2013, 2014 and 2015 [9–11]. In Spain, the cluster reported in 2018 is the first recorded cluster of locally-acquired dengue cases, which was not unexpected as *Aedes albopictus* has been present in the country since 2004 [4]. These events highlight the risk of local dengue virus transmission in areas where competent mosquito vectors are established. In the southern part of the continental EU/EEA, *Aedes albopictus* is established, and between mid-spring and mid-autumn environmental conditions are considered favourable for vector activity and therefore autochthonous transmission of dengue virus [12]. *Aedes aegypti*, the primary vector for dengue virus transmission globally, is not established in the continental EU/EEA, but the species is established around the Black Sea and in several EU Overseas Countries and Territories such as Madeira, Réunion and several Caribbean islands (e.g. Martinique and Guadeloupe).

Public health implications

Vigilance regarding imported cases of dengue and other diseases transmitted by *Aedes* mosquitoes remains essential. Public health authorities in the EU/EEA should consider raising awareness among clinicians and travel clinic specialists about the risk related to dengue, especially in areas where competent mosquito vectors are present and environmental conditions are suitable for transmission [12]. There is no recommended vaccine available against dengue in Europe and treatment of the disease is purely supportive. Prevention is based on protection against mosquito bites. The detection of an autochthonous case should trigger epidemiological and entomological investigations to assess the size of the transmission area and the potential for onward transmission; it should also guide vector control measures. *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) [4,13].

Transmission of dengue virus through transfusion of erythrocytes, platelets and plasma [14–19], as well as through kidney, liver and bone marrow transplantation, has been reported [20,21]. 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 [22].

Preparedness plans to contain and/or mitigate the spread of dengue in the EU/EEA should address the following aspects:

- strengthened surveillance systems (including clinician awareness, laboratory capacity and capability for accurate confirmation and rapid notification of cases)
- regular reviews of contingency plans for mosquito-borne outbreaks
- education of the general public on how to control mosquito breeding sites; and
- enhanced vector surveillance and rapid implementation of vector control measures following each case.

References

1. European Centre for Disease Prevention and Control. Introduction to the Annual Epidemiological Report Stockholm: ECDC; 2019. Available from: <https://ecdc.europa.eu/en/annual-epidemiological-reports/methods>
2. European Centre for Disease Prevention and Control. Surveillance systems overview [internet, downloadable spreadsheet]. Stockholm: ECDC; 2019. Available from: <https://www.ecdc.europa.eu/en/publications-data/surveillance-systems-overview-2018>
3. European Centre for Disease Prevention and Control. Surveillance atlas of infectious diseases [Internet]. Stockholm: ECDC; 2018 [30 January 2018]. Available from: <https://atlas.ecdc.europa.eu/public/index.aspx?Dataset=27&HealthTopic=16>
4. European Centre for Disease Prevention and Control. Rapid Risk Assessment: Local transmission of dengue fever in France and Spain, 2018 — 22 October 2018. Stockholm: ECDC, 2018. Available from: <https://www.ecdc.europa.eu/en/publications-data/rapid-risk-assessment-local-transmission-dengue-fever-france-and-spain>
5. European Centre for Disease Prevention and Control. Autochthonous transmission of dengue virus in EU/EEA, 2010-2019 [Internet]. Stockholm: ECDC; 2019 [updated 28 October 2019]. Available from: <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. Communicable Disease Threats Report - Week 4, 20–26 January 2019 [Internet]. Stockholm: ECDC; 2019 [cited 2019 Oct 28]. Available from: <https://www.ecdc.europa.eu/sites/default/files/documents/communicable-disease-threats-report-26-january-2019.pdf>
7. Pan American Health Organization/World Health Organization. Epidemiological Update Dengue. 22 February 2019 [Internet]. Washington, D.C.: PAHO/WHO; 2019. Available from: https://www.paho.org/hq/index.php?option=com_docman&view=download&category_slug=dengue-2217&alias=47782-22-february-2019-dengue-epidemiological-update&Itemid=270&lang=en
8. Pan American Health Organization/World Health Organization. PLISA Health Information Platform for the Americas: Reported Cases of Dengue Fever in The Americas [Internet]. Washington, D.C. PAHO/WHO; 2019 [cited 28 October 2019]. Available from: <http://www.paho.org/data/index.php/en/mnu-topics/indicadores-dengue-en/dengue-nacional-en/252-dengue-pais-ano-en.html>
9. Giron S, Rizzi J, Leparç-Goffart I, Septfons A, Tine R, Cadiou B. New occurrence of autochthonous cases of dengue fever in south-east France, August-September 2014. *Bull Epidemiol Hebd (Paris)*. 2015;13-4.
10. Marchand E, Prat C, Jeannin C, Lafont E, Bergmann T, Flusin O, et al. Autochthonous case of dengue in France, October 2013. *Eurosurveillance*. 2013;18(50):20661.
11. Succo T, Leparç-Goffart I, Ferré J-B, Roiz D, Broche B, Maquart M, et al. Autochthonous dengue outbreak in Nîmes, south of France, July to September 2015. *Eurosurveillance*. 2016;21(21).
12. European Centre for Disease Prevention and Control. Mosquito maps [Internet]. Stockholm: ECDC; 2019. Available from: <https://ecdc.europa.eu/en/disease-vectors/surveillance-and-disease-data/mosquito-maps>
13. European Centre for Disease Prevention and Control. Factsheet about dengue fever [Internet]. Stockholm: ECDC. Available from: <https://ecdc.europa.eu/en/dengue-fever/facts/factsheet>
14. Chuang VW, Wong TY, Leung YH, Ma ES, Law YL, Tsang OT, et al. Review of dengue fever cases in Hong Kong during 1998 to 2005. *Hong Kong Med J*. 2008 Jun;14(3):170-7.
15. Tambyah PA, Koay ES, Poon ML, Lin RV, Ong BK. Dengue hemorrhagic fever transmitted by blood transfusion. *The New England Journal of Medicine*. 2008 Oct 2;359(14):1526-7.
16. Stramer SL, Linnen JM, Carrick JM, Foster GA, Krysztof DE, Zou S, et al. Dengue viremia in blood donors identified by RNA and detection of dengue transfusion transmission during the 2007 dengue outbreak in Puerto Rico. *Transfusion*. 2012 Aug;52(8):1657-66.
17. Levi JE, Nishiya A, Felix AC, Salles NA, Sampaio LR, Hangai F, et al. Real-time symptomatic case of transfusion-transmitted dengue. *Transfusion*. 2015 May;55(5):961-4.
18. 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*. 2015 Jul;55(7):1655-61.
19. 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*. 2016 Jan;56(1):215-22.

20. Rosso F, Pineda JC, Sanz AM, Cedano JA, Caicedo LA. Transmission of dengue virus from deceased donors to solid organ transplant recipients: case report and literature review. *The Brazilian Journal of Infectious Diseases: an official publication of the Brazilian Society of Infectious Diseases*. 2018 Jan – Feb;22(1):63-9.
21. 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. *Emerging Infectious Diseases*. 2014 Aug;20(8):1366-9.
22. European Directorate for the Quality of Medicines and Healthcare CoE. Guide to the preparation, use and quality assurance of blood components 19th ed. European Directorate for the Quality of Medicines and Healthcare: Strasbourg, 2017.