

Dengue

Annual Epidemiological Report for 2017

Key facts

- For 2017, 27 countries reported 2 026 travel-associated cases of dengue fever, of which 1 818 (89.7%) were confirmed.
- The EU/EEA notification rate in 2017 was 0.4 cases per 100 000 population.
- The highest rates in both men and women were 25–44 years of age.
- The number of cases peaked in August followed by peaks in November and March.
- Twenty-two percent of the cases were imported from India.

Methods

This report is based on data for 2017 retrieved from The European Surveillance System (TESSy) on 10 December 2018. 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. Four countries reported zero cases (Croatia, the Czech Republic, Luxembourg and the Netherlands). No data were reported by Bulgaria, Cyprus, Denmark and Liechtenstein.

Reported data for dengue were heterogeneous as no specific case definition was available in 2017. Eighteen countries referred to the EU's 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 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 2017. Stockholm: ECDC; 2019.

Stockholm, April 2019

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

Epidemiology

For 2017, 23 countries reported 2 026 cases of dengue, of which 1 818 (89.7%) were confirmed (Table 1). All reported cases were travel-related.

The EU/EEA notification rate in 2017 was 0.4 cases per 100 000 population, similar to the previous years.

Germany reported the highest proportion of cases (31.3%), followed by the United Kingdom (23.0%), France, Spain and Sweden (Table 1, Figure 1).

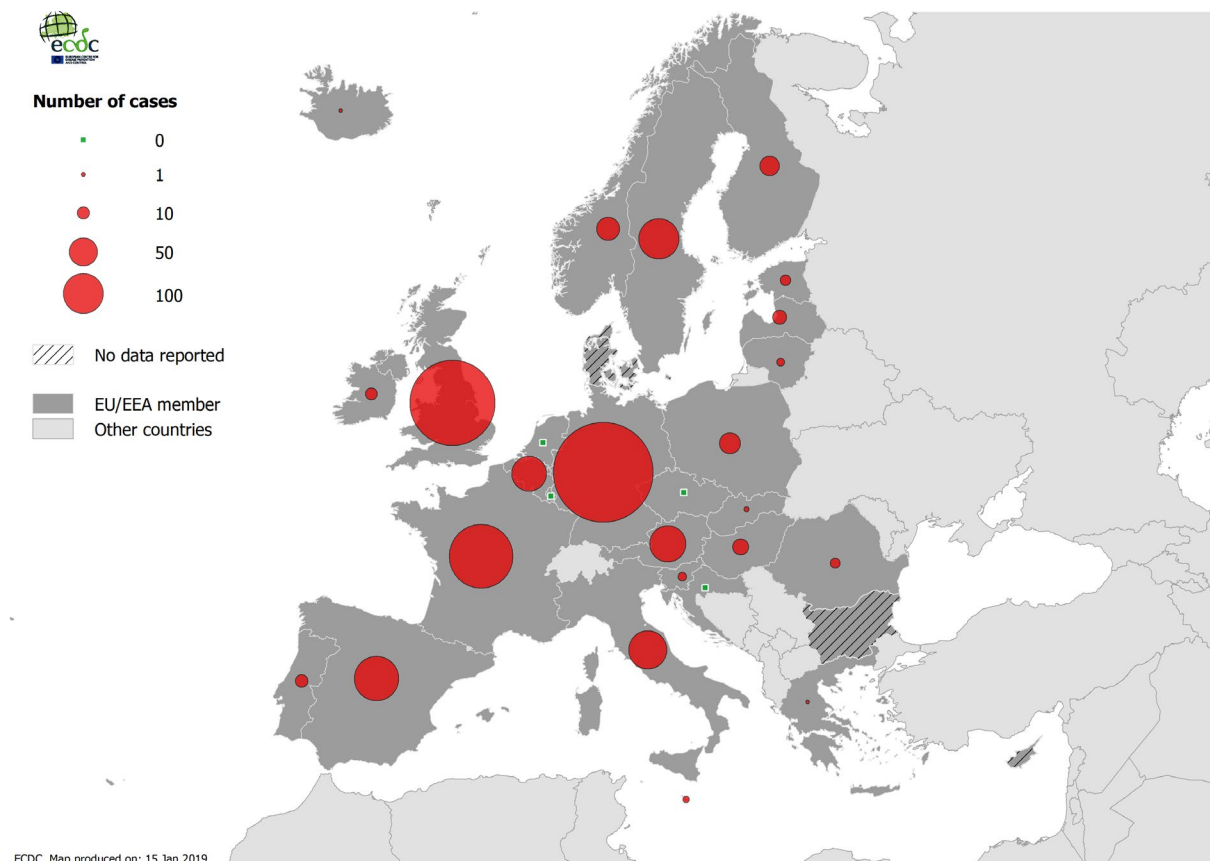
Table 1. Distribution of dengue cases and rates per 100 000 population by country and year, EU/EEA, 2013–2017

Country	2013		2014		2015		2016		2017		
	Reported cases	Rate	Reported cases	Rate	Reported cases	Rate	Reported cases	Rate	Reported cases	Rate	Confirmed cases
Austria	89	1.1	91	1.1	103	1.2	116	1.3	85	1.0	85
Belgium	139	1.2	110	1.0	108	1.0	114	1.0	77	0.7	77
Bulgaria	.	.	.	.	.	.	.	.	.	.	.
Croatia	3	0.1	2	0.0	.	.	2	0.0	0	0.0	0
Cyprus	.	.	.	.	.	.	.	.	.	.	.
Czech Republic	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0
Denmark	.	.	.	.	.	.	.	.	.	.	.
Estonia	0	0.0	9	0.7	12	0.9	9	0.7	8	0.6	8
Finland	80	1.5	38	0.7	54	1.0	66	1.2	25	0.5	25
France	271	0.4	212	0.3	167	0.3	297	0.4	264	0.4	240
Germany	877	1.1	624	0.8	723	0.9	956	1.2	635	0.8	635
Greece	1	0.0	4	0.0	2	0.0	2	0.0	1	0.0	1
Hungary	10	0.1	6	0.1	12	0.1	24	0.2	17	0.2	15
Iceland	0	0.0	0	0.0	0	0.0	0	0.0	1	0.3	1
Ireland	15	0.3	21	0.5	8	0.2	18	0.4	10	0.2	10
Italy	142	0.2	79	0.1	103	0.2	106	0.2	95	0.2	95
Latvia	7	0.3	1	0.0	4	0.2	9	0.5	13	0.7	13
Liechtenstein	.	.	.	.	.	.	.	.	.	.	.
Lithuania	1	0.0	3	0.1	9	0.3	4	0.1	4	0.1	0
Luxembourg	0	0.0	0	0.0	0	0.0	1	0.2	0	0.0	0
Malta	0	0.0	0	0.0	1	0.2	1	0.2	3	0.7	3
Netherlands	.	.	3	-	18	-	6	-	0	-	0
Norway	57	1.1	73	1.4	98	1.9	64	1.2	35	0.7	35
Poland	13	0.0	15	0.0	12	0.0	41	0.1	29	0.1	10
Portugal	.	.	.	.	14	0.1	13	0.1	11	0.1	10
Romania	6	0.0	6	0.0	7	0.0	8	0.0	7	0.0	7
Slovakia	4	0.1	0	0.0	2	0.0	4	0.1	2	0.0	2
Slovenia	8	0.4	2	0.1	3	0.1	6	0.3	5	0.2	5
Spain	0	0.0	0	0.0	168	0.4	261	0.6	128	0.3	49
Sweden	220	2.3	119	1.2	159	1.6	225	2.3	106	1.1	106
United Kingdom	571	0.9	376	0.6	423	0.7	468	0.7	465	0.7	386
EU/EEA	2 514	0.5	1 794	0.4	2 210	0.5	2 821	0.6	2 026	0.4	1 818

..: no data reported

-.: no rate calculated.

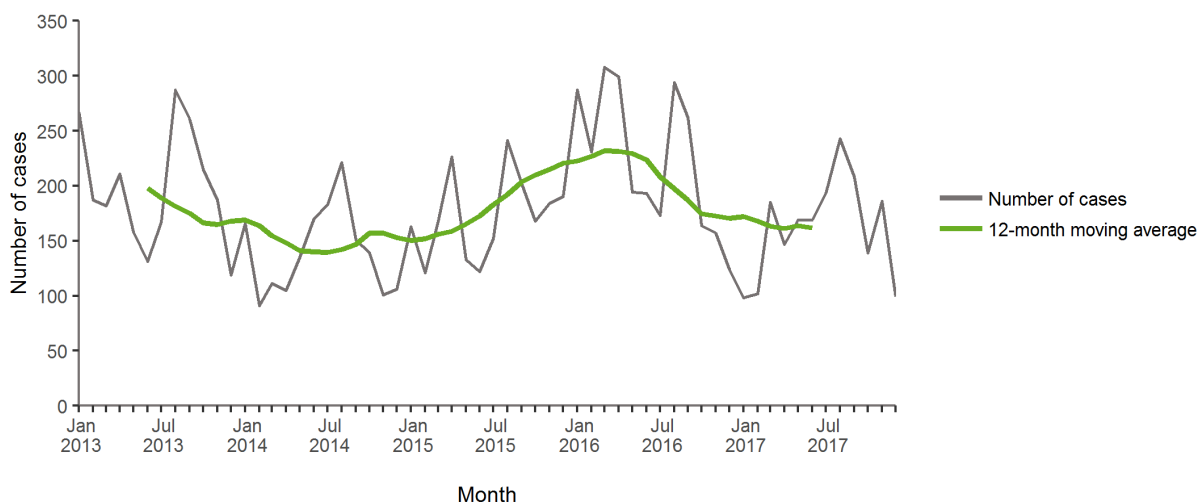
Figure 1. Distribution of dengue cases by country, EU/EEA, 2017



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, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden and the United Kingdom.

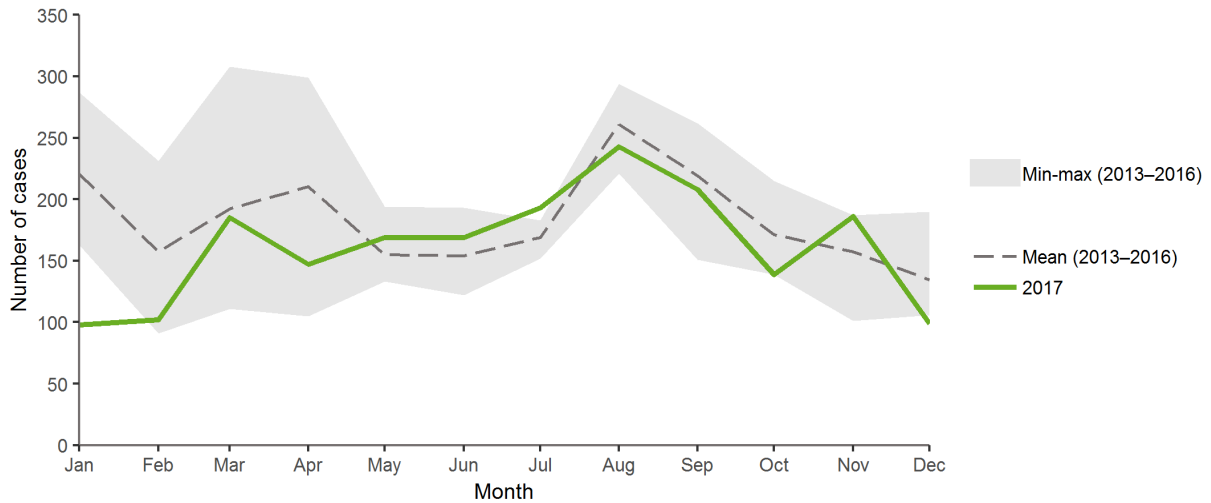
The numbers of dengue cases fluctuated during the year. High numbers of cases (n=647; 31.9%) were reported in July, August and September, with a peak in August (n=246; 12.1%). Two other peaks were reported in November (n=188; 9.3%) and March (n=185; 9.1%). The seasonal pattern of reported cases is very similar to what was observed in 2013–2016 (Figures 2,3).

Figure 2. Distribution of dengue cases by month, EU/EEA, 2013–2017



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

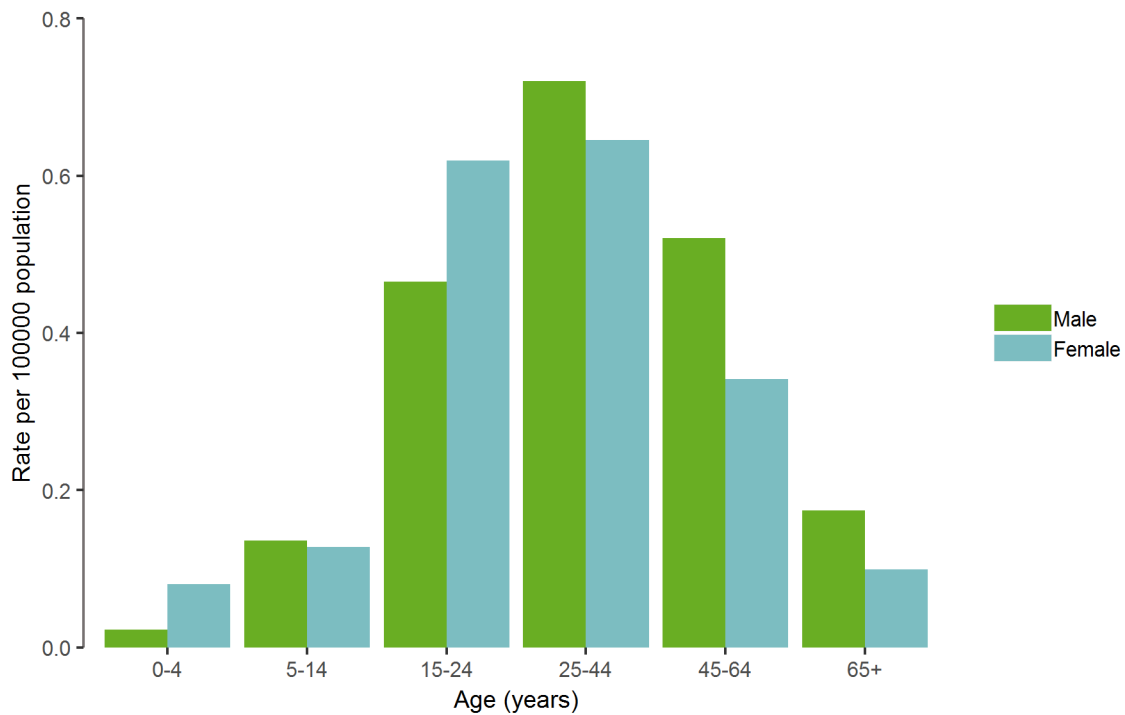
Figure 3. Distribution of dengue cases by month, EU/EEA, 2013–2016 and 2017



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

In 2017, the male-to-female ratio was 1.2:1. The majority of the cases were 25–44 years of age (n=914, 45.1%). The highest rates were observed in the age groups 15–24 and 25–44 years with 0.5 and 0.7 cases per 100 000 population respectively (Figure 4).

Figure 4. Distribution of dengue cases per 100 000 population by age and gender, EU/EEA, 2017



In 2017, most of the 1 132 cases for which the probable place of infection was known were infected in India (22.0%), Thailand (19.7%) and Sri Lanka (11.3%).

Outbreaks and other threats

As in previous years, the Americas and Asia were the regions most affected by dengue around the world [4].

In the Americas, the number of cases drastically decreased in 2017 to about 574 000 cases from about 2.17 million in 2016. Brazil reported the highest number of cases, with almost 250 000 cases, followed by Mexico (n=89 893) and Peru (n=76 093) [5].

In Asia, the most affected countries were Sri Lanka, Vietnam and India, with a 3.4-fold increase of cases in Sri Lanka compared with 2016, a 1.5-fold increase in Vietnam and a 1.2-fold increase in India [5].

Discussion

The number of travel-related dengue cases reported for 2017 was lower than the average yearly number of cases reported between 2013–2016, likely due to lower transmission of the virus in certain countries visited by EU/EEA travellers.

The majority of travel-related dengue cases in 2017 were imported from Asia, reflecting the dengue situation in tropical regions where the disease is endemic. In India and Sri Lanka, the number of dengue cases greatly increased in 2017 compared with 2012–2016. Travel-related dengue cases from India and Sri Lanka similarly increased in 2017. Only 5% of travel-related cases with a known probable place of infection were imported from Indonesia (compared with 18.2% in 2016), where a large decrease was observed compared with the previous five years.

The age and gender distribution of the dengue cases most likely reflect the demographic characteristics of travellers from the EU/EEA rather than other risk factors. Similarly, the seasonality in case occurrence reflects holiday seasons, with most cases occurring in the summer.

No autochthonous dengue transmission was reported in the continental EU/EEA. In 2013, 2014 and 2015, France reported autochthonous dengue cases following one or multiple introductions of the virus [6–8]. These recurrent 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 [9]. *Aedes aegypti*, the primary vector for dengue virus transmission, 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 and several islands in the Caribbean region (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 should consider raising awareness about the risk related to dengue among clinicians and travel clinic specialists in the EU/EEA, especially in areas where competent mosquito vectors are present and environmental conditions are suitable for transmission [9]. There is currently no recommended vaccine available against dengue in Europe and treatment of the disease is symptomatic and 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 potential of 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) [10,11].

Transmission of dengue virus through transfusion of erythrocytes, platelets and plasma [12–17], as well as through kidney, liver and bone marrow transplantation, have been reported [18,19]. Therefore, measures to prevent dengue virus transmission via substances of human origin should be implemented depending on whether or not an area is affected by dengue. These measures may include donor deferral, donor/donation screening, blood donation quarantine, post-donation information and pathogen inactivation of plasma and platelets [20].

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 and collaboration of the general public on how to control mosquito breeding sites; and
- strengthened vector surveillance systems 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. In: ECDC. Annual epidemiological report for 2017 [Internet]. Stockholm: ECDC; 2017 [cited 10 December 2018]. Available from: <http://ecdc.europa.eu/annual-epidemiological-reports/methods>
2. European Centre for Disease Prevention and Control. Surveillance systems overview for 2017 [Internet, downloadable spreadsheet]. Stockholm: ECDC; 2018 [cited 10 December 2018]. Available from: <http://ecdc.europa.eu/publications-data/surveillance-systems-overview-2017>
3. European Centre for Disease Prevention and Control. Surveillance atlas of infectious diseases [Internet]. Stockholm: ECDC; 2018 [cited 10 December 2018]. Available from: <http://atlas.ecdc.europa.eu/public/index.aspx?Dataset=27&HealthTopic=16>
4. World Health Organisation. Dengue control – Dengue data application [Internet]. Geneva: WHO; 2019 [cited 10 December 2018]. Available from: http://www.who.int/denguecontrol/epidemiology/dengue_data_application
5. European Centre for Disease Prevention and Control. Communicable Disease Threats Report, Week 4, 21-27 January 2018. Stockholm: ECDC; 2018. Available from: <http://ecdc.europa.eu/publications-data/communicable-disease-threats-report-21-27-january-2018-week-4>
6. Giron S, Rizzi J, Leparç-Goffart I, Septfons A, Tine R, Cadiou B, et al. New occurrence of autochthonous cases of dengue fever in southeast France, August-September 2014. Bull Epidémiol Hebd. 2015 Apr 28;(13-14):217.
7. Marchand E, Prat C, Jeannin C, Lafont E, Bergmann T, Flusin O, et al. Autochthonous case of dengue in France, October 2013. Euro Surveill. 2013 Dec 12;18(50):20661. Available from: <http://www.eurosurveillance.org/content/10.2807/1560-7917.ES2013.18.50.20661>
8. Succo T, Leparç-Goffart I, Ferre JB, Roiz D, Broche B, Maquart M, et al. Autochthonous dengue outbreak in Nîmes, South of France, July to September 2015. Euro Surveill. 2016 May 26;21(21).
9. European Centre for Disease Prevention and Control. Mosquito maps [Internet]. Stockholm: ECDC; 2019. Available from: <http://ecdc.europa.eu/disease-vectors/surveillance-and-disease-data/mosquito-maps>
10. 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: <http://ecdc.europa.eu/publications-data/rapid-risk-assessment-local-transmission-dengue-fever-france-and-spain>
11. European Centre for Disease Prevention and Control. Factsheet about dengue fever [Internet]. Stockholm: ECDC; 2019 [cited 10 December 2018]. Available from: <http://ecdc.europa.eu/dengue-fever/facts/factsheet>
12. Chuang V, Wong TY, Leung YH, Ma E, Law YL, Tsang O, et al. Review of dengue fever cases in Hong Kong during 1998 to 2005. Hong Kong Med J. 2008 Jun;14(3):170-7.
13. 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.
14. 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.
15. Levi JE, Nishiya A, Félix AC, Salles NA, Sampaio LR, Hangai F, et al. Real-time symptomatic case of transfusion-transmitted dengue. Transfusion. 2015 May;55(5):961-4.
16. 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.
17. Matos D, Tomashek KM, Perez-Padilla J, Muñoz-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.
18. 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. Braz J Infect Dis. 2018 Jan - Feb;22(1):63-69.
19. Punzel M, Korukluoğlu G, Caglayik DY, Menemenlioglu D, Bozdog SC, Tekgündüz 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.
20. European Directorate for the Quality of Medicines and HealthCare. Guide to the preparation, use and quality assurance of blood components – Recommendation No. R (95) 15 – 19th Edition. Strasbourg: Council of Europe; 2017. Available from: <http://www.edqm.eu/blood-transfusion-guide>