



SURVEILLANCE REPORT

Annual Epidemiological Report for 2015

Malaria

Key facts

- 6 199 confirmed malaria cases were reported to TESSy in 2015.
- The notification rate in 2015 was 1.0 cases per 100 000 population.
- 99.8% of the cases for which this information was provided were travel related. Seven confirmed cases were reported as locally acquired (five reported by Greece, one by Belgium and one by the Netherlands).
- The highest notification rates were reported in males in the age groups 15–24 and 25–44 years.
- The number of cases increased during the summer months and then decreased slowly until February. These changes most probably reflect travel patterns.
- The worldwide decrease in malaria incidence did not yet result in a decrease of travel-related cases reported in the EU/EEA. Therefore, awareness among travellers and clinicians – particularly among people visiting friends and relatives in endemic countries – should remain high.
- Local transmission of *Plasmodium vivax* remains possible in the EU and stresses the need for continued surveillance, preparedness and prevention activities.

Methods

This report is based on data for 2015 retrieved from The European Surveillance System (TESSy) on 30 June 2017. 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, please 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-six EU/EEA countries provided information on malaria. No data were reported by Denmark, Iceland, Italy and Liechtenstein.

Twenty-three countries used the EU case definition, two countries (Belgium and Finland) did not specify which case definition was used, and one country used an alternative case definition (France). Surveillance is mostly case based except in Bulgaria and Croatia. The surveillance coverage for France is not nationwide.

All reporting countries have a comprehensive surveillance system. Reporting is compulsory in 24 countries, voluntary in two countries (Belgium and France), and 'not specified' in the United Kingdom. Disease surveillance is

Suggested citation: European Centre for Disease Prevention and Control. Malaria. In: ECDC. Annual epidemiological report for 2015. Stockholm: ECDC; 2018.

Stockholm, January 2018

© European Centre for Disease Prevention and Control, 2018. Reproduction is authorised, provided the source is acknowledged.

mostly passive except in the Czech Republic, Slovakia and the United Kingdom, where active surveillance is in place. Greece also has active disease surveillance in high-risk areas [2].

Epidemiology

Most reported malaria cases were travel related. Seven cases were reported as locally acquired (five confirmed cases reported by Greece, one by Belgium, and one by the Netherlands).

The five locally acquired confirmed cases of *Plasmodium vivax* malaria reported by Greece were located in four of five receptive rural areas where the presence of competent Anopheles mosquitoes is combined with the presence of malaria patients coming from endemic countries.

The confirmed case of locally acquired malaria reported by Belgium was a case of so-called 'suitcase malaria'.

The confirmed case of locally acquired malaria reported by the Netherlands involved a baby with congenital *Plasmodium vivax* born in the Netherlands from an Eritrean woman who had applied for political asylum.

The overall confirmed case rate in 2015 was 1.0 cases per 100 000 population, which is identical to the rate in 2014. The individual country rates varied between 0.1 cases (Hungary, Latvia, Poland) and 2.6 cases (Sweden) per 100 000 population.

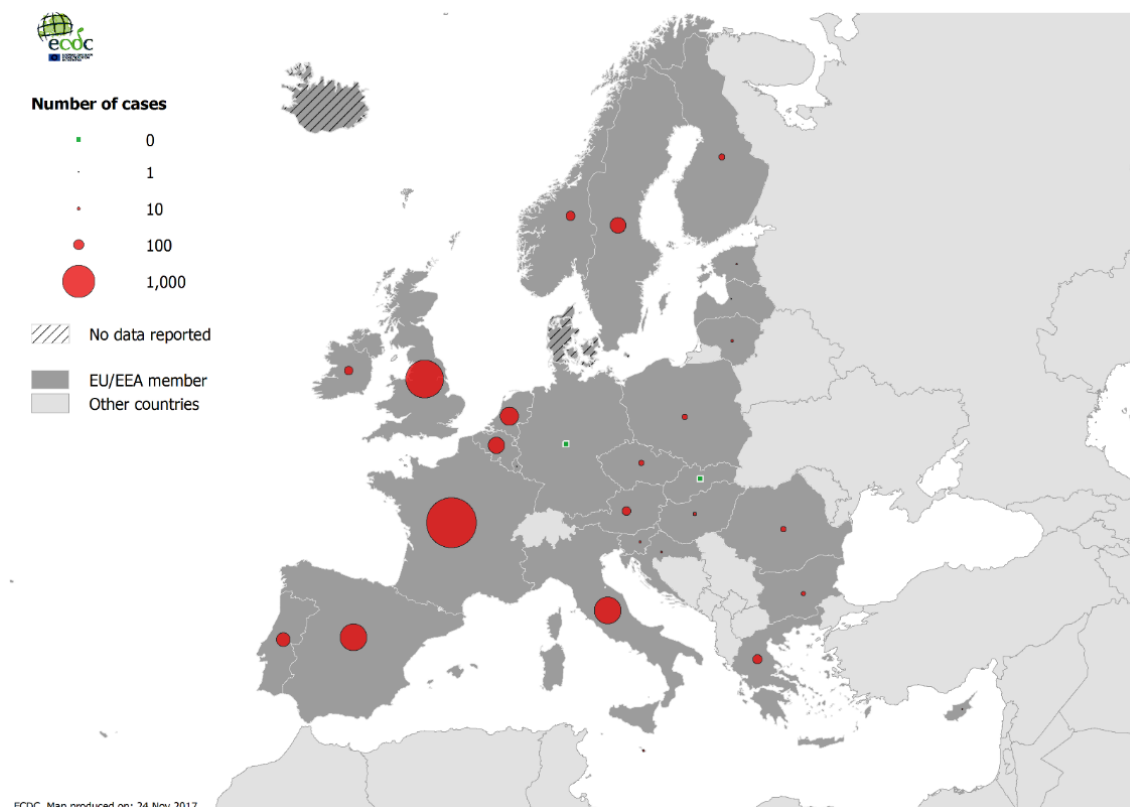
As in previous years, the highest number of confirmed cases notified in 2015 was observed in France (n=2 500), followed by the United Kingdom (n=1 397) (Table 1).

The case fatality rate among the reported cases was 0.37% (n=23), similar to the one reported in 2014 (n=22).

Table 1. Distribution of confirmed cases of malaria, EU/EEA, 2011–2015

Country	2011		2012		2013		2014		National coverage	Reported cases	2015		
	Confirmed cases		Confirmed cases		Confirmed cases		Confirmed cases				Confirmed cases		
	Number	Rate	Number	Rate	Number	Rate	Number	Rate			Number	Rate	ASR
Austria	7	0.1	28	0.3	42	0.5	68	0.8	Y	81	81	0.9	1.0
Belgium	184	1.7	206	1.9	253	2.3	235	2.1	Y	276	276	2.5	2.5
Bulgaria	8	0.1	16	0.2	8	0.1	10	0.1	Y	20	20	0.3	0.3
Croatia	.	.	23	0.5	0	0.0	6	0.1	Y	7	7	0.2	0.2
Cyprus	6	0.7	1	0.1	3	0.3	8	0.9	Y	3	3	0.4	0.3
Czech Republic	28	0.3	25	0.2	27	0.3	30	0.3	Y	29	29	0.3	0.3
Denmark	.	.	.	.	.	.	.	.	.	.	.	.	.
Estonia	1	0.1	6	0.5	3	0.2	3	0.2	Y	4	4	0.3	0.3
Finland	33	0.6	46	0.9	38	0.7	39	0.7	Y	39	39	0.7	0.8
France	1891	-	1851	-	2165	-	2299	-	N	2500	2500	-	-
Germany	0	0.0	0	0.0	0	0.0	0	0.0	Y	1063	0	0.0	0.0
Greece	92	0.8	95	0.9	25	0.2	38	0.3	Y	84	84	0.8	0.8
Hungary	10	0.1	5	0.1	5	0.1	15	0.2	Y	12	12	0.1	0.1
Ireland	61	1.3	65	1.4	71	1.5	79	1.7	Y	82	82	1.8	1.8
Italy	.	.	.	.	.	.	.	.	.	.	.	.	.
Latvia	4	0.2	3	0.1	4	0.2	6	0.3	Y	1	1	0.1	0.1
Lithuania	3	0.1	6	0.2	8	0.3	5	0.2	Y	8	8	0.3	0.3
Luxembourg	3	0.6	7	1.3	4	0.7	3	0.5	Y	2	1	0.2	0.2
Malta	1	0.2	2	0.5	5	1.2	3	0.7	Y	7	7	1.6	1.7
Netherlands	253	1.5	194	1.2	162	1.0	276	1.6	Y	340	340	2.0	2.1
Poland	14	0.0	21	0.1	36	0.1	19	0.0	Y	29	29	0.1	0.1
Portugal	67	0.6	71	0.7	117	1.1	144	1.4	Y	195	194	1.9	1.9
Romania	40	0.2	32	0.2	43	0.2	47	0.2	Y	30	30	0.2	0.1
Slovakia	1	0.0	6	0.1	4	0.1	5	0.1	Y	0	0	0.0	0.0
Slovenia	6	0.3	7	0.3	3	0.1	7	0.3	Y	5	5	0.2	0.2
Spain	405	0.9	421	0.9	518	1.1	688	1.5	Y	713	706	1.5	1.5
Sweden	95	1.0	85	0.9	119	1.2	354	3.7	Y	250	250	2.6	2.7
United Kingdom	1677	2.7	1378	2.2	1501	2.3	1510	2.3	Y	1397	1397	2.2	2.2
EU	4890	0.8	4600	0.7	5164	0.8	5897	1.0	.	7177	6105	1.0	1.0
Iceland	.	.	.	.	.	.	.	.	.	.	.	.	.
Liechtenstein	.	.	.	.	.	.	.	.	.	.	.	.	.
Norway	30	0.6	37	0.7	72	1.4	120	2.3	Y	94	94	1.8	1.9
EU/EEA	4920	0.8	4637	0.7	5236	0.8	6017	1.0	.	7271	6199	1.0	1.0

Source: Country reports. Legend: Y = yes, N = no, . = no data reported, ASR: age-standardised rate, - = no notification rate calculated.

Figure 1. Number of reported confirmed malaria cases, EU/EEA, 2015

Note: 99.9% of the cases are imported.

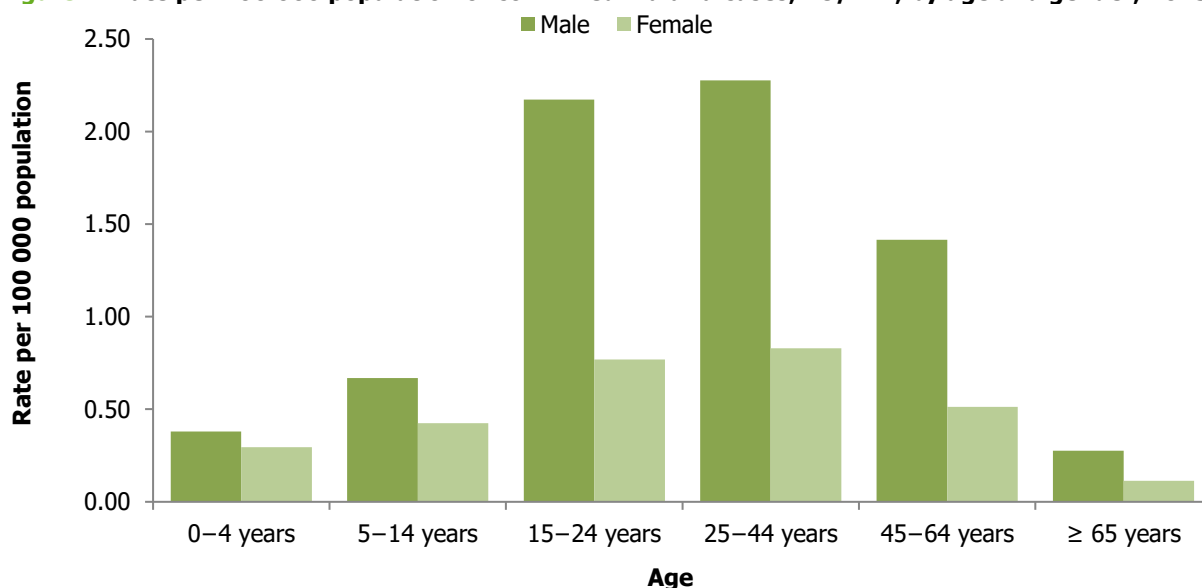
Source: Country reports from Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Estonia, Finland, France, Greece, Hungary, Ireland, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, the United Kingdom.

Age and gender distribution

In 2015, the overall rate of confirmed malaria cases was higher among men than women (1.4 cases and 0.5 cases per 100 000 population, respectively), and the male-to-female ratio was 2.2:1. The highest notification rate for males was in the 25–44-year-old age group (2.3 cases per 100 000 population), followed by the group of 15–24-year-olds (2.2 cases per 100 000 population).

Among females, the highest notification rate was in the age groups 15–24 years and 25–44 years (0.8 cases per 100 000 population for both) (Figure 2).

Figure 2. Rate per 100 000 population of confirmed malaria cases, EU/EEA, by age and gender, 2015

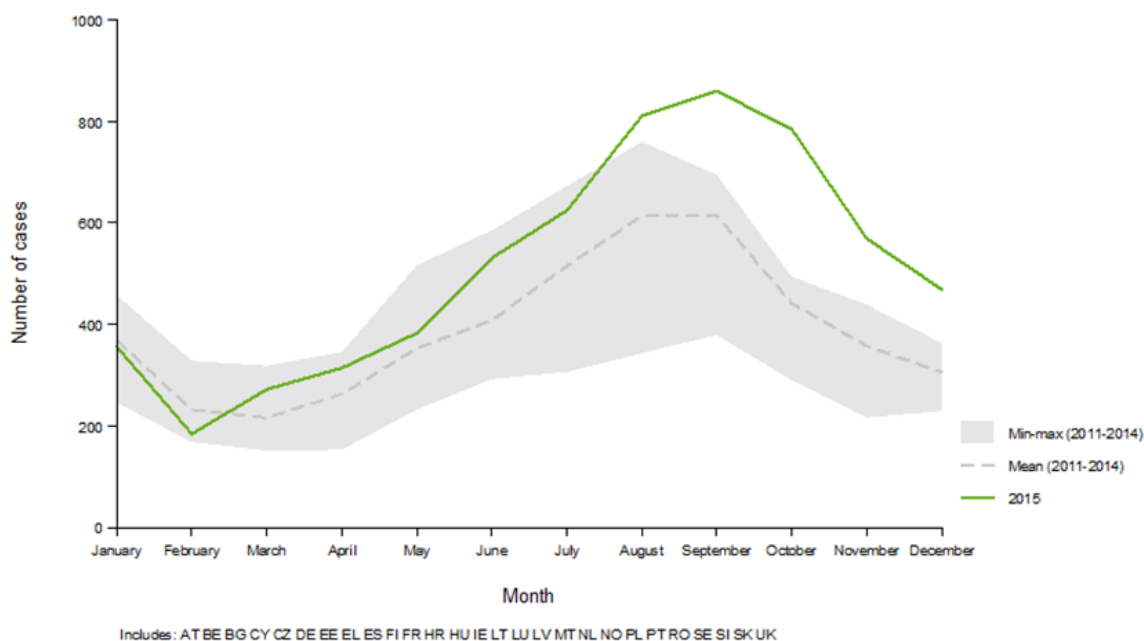


Source: Country reports from Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Estonia, Finland, Greece, Hungary, Ireland, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, the United Kingdom.

Seasonality

A marked seasonal trend was observed across all countries, with cases increasing during the summer holiday months (July–September). Compared to the trend 2011–2014, the number of cases between July and December was higher in 2015.

Figure 3. Seasonal distribution of confirmed malaria cases, EU/EEA, 2015 compared with 2011–2014

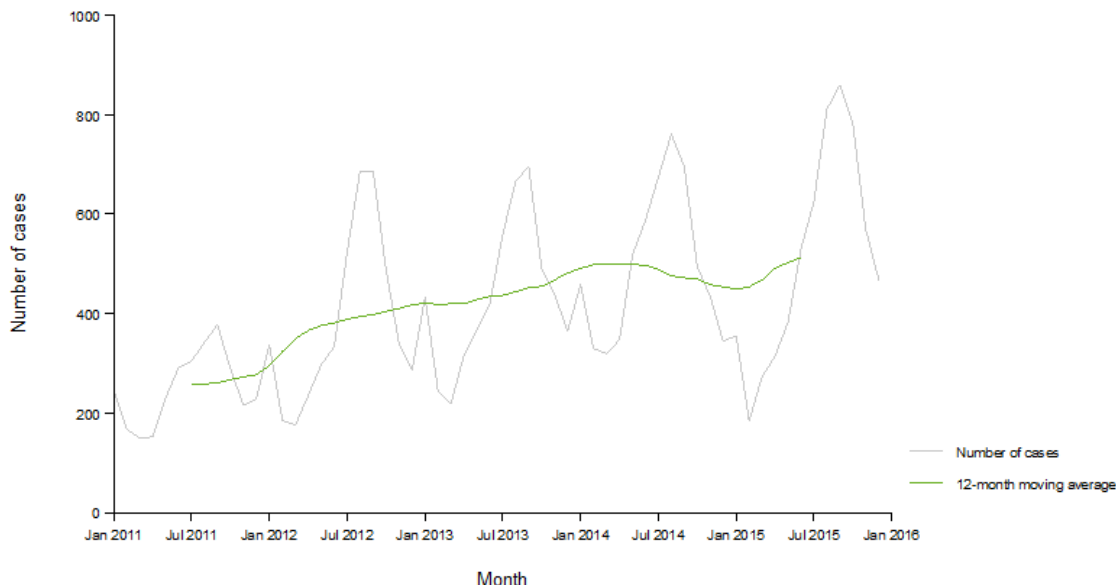


Source: Country reports from Austria, Belgium, Cyprus, the Czech Republic, Estonia, Finland, Greece, Hungary, Ireland, Latvia, Lithuania, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, the United Kingdom.

Trend

In the period 2011–2015, the highest number of reported cases was seen in 2015. All in all, the trend showed a continuous increase.

Figure 4. Trend and number of confirmed malaria cases, EU/EEA, 2011–2015



Source: AT BE BG CY CZ DE EE EL ES FI FR HR HU IE LT LU LV MT NL NO PL PT RO SE SI SK UK

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

Discussion

The notification rate of confirmed malaria cases reported by EU and EEA countries has remained stable over the last few years and hovers at about 1 case per 100 000 population per year, with a slight increase in 2014–2015 (1.24 cases per 100 000 population) compared with 2010–2013.

WHO reported that between 2000 and 2015, the rate of new cases of malaria worldwide fell by 41%. Meanwhile the global malaria count in 2015 was 212 million new cases and 429 000 deaths [4]. Most of the cases in 2015 were reported in the WHO African Region (90%), followed by the WHO South-East Asia Region (7%). About 4% of estimated cases globally are due to *P. vivax*, but outside the African continent the proportion of *P. vivax* infections is 41%.

Current malaria control interventions seem to have considerably reduced malaria incidence [5]. The reduction in global malaria incidence did not yet result in a decline of the notification rate observed in the EU/EEA.

Nearly all (99.9%) malaria cases reported by EU/EEA countries were imported and have strong ties with endemic areas, particularly in Africa. Travel routes from West Africa to France and the United Kingdom showed the strongest links to imported malaria. A number of historical, economic, linguistic and cultural factors and ties seem to play a role [6].

Seasonality and age distribution most likely reflect travel patterns to malaria-endemic countries. Information on the reasons for travel, i.e. holidays, visiting friends and relatives, or business, was not available. Travellers visiting friends and relatives in endemic countries constitute a significant group for malaria importation to the EU [7]. A review of the literature suggests that a substantial proportion of imported malaria cases in the EU/EEA occur among recent immigrants from malaria-endemic countries and among more settled migrants and their families who have travelled to visit friends and relatives in malaria-endemic home countries [8]. Outside continental Europe, some European territories are endemic for malaria (e.g. Mayotte and French Guiana); data for these regions are not collected through TESSy.

A small number of cases of autochthonous transmission of malaria was reported over the last 10 years [9–13]. In 2014, for the first time since 2009, Greece did not report any locally acquired cases. In 2015, however, Greece reported six locally acquired *Plasmodium vivax* malaria cases (five confirmed cases and one probable case) in several vulnerable and receptive areas. One case each was reported from Farkadona–Trikala regional unit, Evrotas–Lakonia regional unit, Tempí–Larisa regional unit, Thiva–Viotia regional unit; two cases were notified in

Marathon–East Attica regional unit [14]. This re-emergence of sporadic locally acquired cases in Greece was probably linked to a significant increase of newly arriving migrants from endemic countries in 2015.

Public health implications

The worldwide decrease in malaria incidence did not yet result in a decrease of the travel-related malaria cases reported in the EU/EEA. Therefore, awareness among clinicians and travellers – particularly among people visiting friends and relatives in endemic countries – should remain high. Vigilance should remain high with regard to transmission through substances of human origin, e.g. blood products or organ transplants.

Data also indicate that local transmission of *Plasmodium vivax* remains possible in the EU, though transmission routes are not always easily detected. This emphasises the need for surveillance, preparedness and prevention in the EU/EEA. Further steps should be taken to improve access to healthcare for migrants.

References

1. European Centre for Disease Prevention and Control. Introduction to the Annual epidemiological report for 2015. In: ECDC. Annual epidemiological report for 2015. Stockholm: ECDC; 2017. Available from: <https://ecdc.europa.eu/en/annual-epidemiological-reports-2016/methods>.
2. European Centre for Disease Prevention and Control. Surveillance systems overview [internet]. Stockholm: ECDC; 2017. Available from: https://ecdc.europa.eu/sites/portal/files/documents/Table-surveillance_systems_overview_0.xlsx
3. European Centre for Disease Prevention and Control. Surveillance atlas of infectious diseases [internet]. Stockholm: ECDC; 2017 [Cited 30 May 2017]. Available from: <http://atlas.ecdc.europa.eu/public/index.aspx?Dataset=27&HealthTopic=34>
4. World Health Organization. World malaria report 2016. Geneva: WHO; 2016. Available from: <http://apps.who.int/iris/bitstream/10665/252038/1/9789241511711-eng.pdf>
5. Bhatt S, Weiss DJ, Cameron E, Bisanzio D, Mappin B, Dalrymple U, et al. The effect of malaria control on *Plasmodium falciparum* in Africa between 2000 and 2015. *Nature*. 2015. 526(7572): p. 207-211.
6. Tatem AJ, Peng J, Ordanovich D, Falkner M, Huang Z, Howes R et al. The geography of imported malaria to non-endemic countries: a meta-analysis of nationally reported statistics. *Lancet Infect Dis*. 2016 Oct 21. pii: S1473-3099(16)30326-7. doi:10.1016/S1473-3099(16)30326-7.
7. Behrens RH, Neave PE, Jones CO. Imported malaria among people who travel to visit friends and relatives: is current UK policy effective or does it need a strategic change? *Malar J*. 2015 Apr 9;14:149.
8. European Centre for Disease Prevention and Control. Assessing the burden of key infectious diseases affecting migrant populations in the EU/EEA. Stockholm: ECDC; 2014.
9. Romi R, Boccolini D, Menegon M, Rezza G. Probable autochthonous introduced malaria cases in Italy in 2009–2011 and the risk of local vector-borne transmission. *Euro Surveill*. 2012 Nov 29;17(48).
10. Arends JE, Oosterheert JJ, Kraaij-Dirkzwager MM, Kaan JA, Fanoy EB, Haas PJ, et al. Two cases of *Plasmodium falciparum* malaria in the Netherlands without recent travel to a malaria-endemic country. *Am J Trop Med Hyg*. 2013 Sep;89(3):527-30.
11. Gallien S, Taieb F, Hamane S, De Castro N, Molina JM. Autochthonous *falciparum* malaria possibly transmitted by luggage-carried vector in Paris, France, February 2013. *Euro Surveill*. 2013 Oct 3;18(40).
12. Evlampidou I, Danis K, Lenglet A, Tseroni M, Theocharopoulos Y, Panagiotopoulos T. Malaria knowledge, attitudes and practices among migrants from malaria-endemic countries in Evrotas, Laconia, Greece, 2013. *Euro Surveill*. 2015;20(33):pii=21208. Available from: <http://www.eurosurveillance.org/ViewArticle.aspx?ArticleId=21208>
13. Barrado L, Ezpeleta C, Rubio JM, Martín C, Azcona J, Arteaga M et al. Source identification of autochthonous-introduced *Plasmodium vivax* Malaria, Spain. *Infection*. 2017 Feb;45(1):111-114.
14. Hellenic Center for Disease Control and Prevention. Epidemiological surveillance report – Malaria in Greece, 2015, up to 16 Oct 2015. Athens: Hellenic Center for Disease Control and Prevention; 2015. Available from: http://www.keelpno.gr/Portals/0/%CE%91%CF%81%CF%87%CE%B5%CE%AF%CE%B1/%CE%95%CE%BB%CE%BF%CE%BD%CE%BF%CF%83%CE%AF%CE%B1/2015/Malaria_report_ENG_16_10_2015_final-2.pdf