Surveillance for Arboviruses in the WHO European Region

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WOAH Regional Seminar
Vector-Borne Diseases in the European Region
Teramo, Italy
25-27 June 2025

World Health Organization
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Graded Global Emergency Dengue

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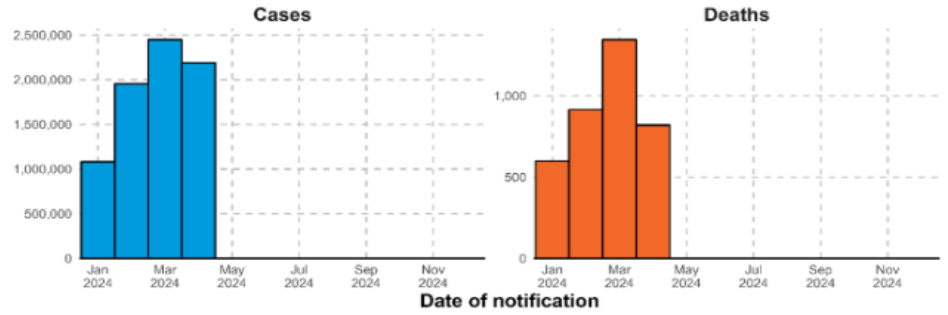
thus dengue remains a global threat to public health.

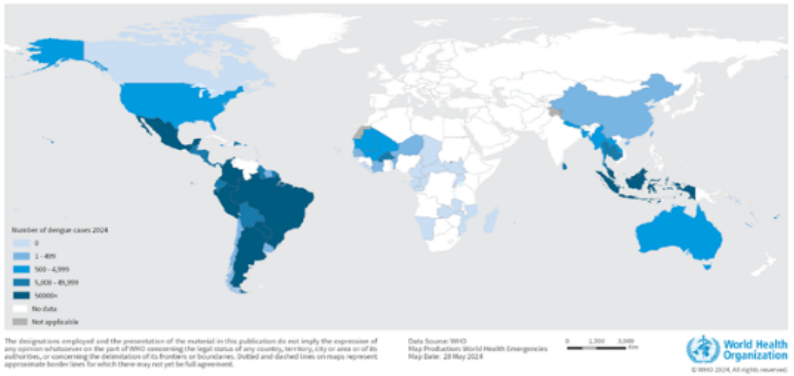
Figure 1. Epidemic curve of dengue cases and deaths as reported to WHO from January to April 2024*



The global dengue surveillance system is still under development and not all countries are reflected at this stage

** Note: includes 103 countries so far integrated in the WHO global surveillance system, 28 of which have submitte zero reports to date*

Figure 2: Geographical distribution of dengue cases as reported to WHO from January to April 2024*

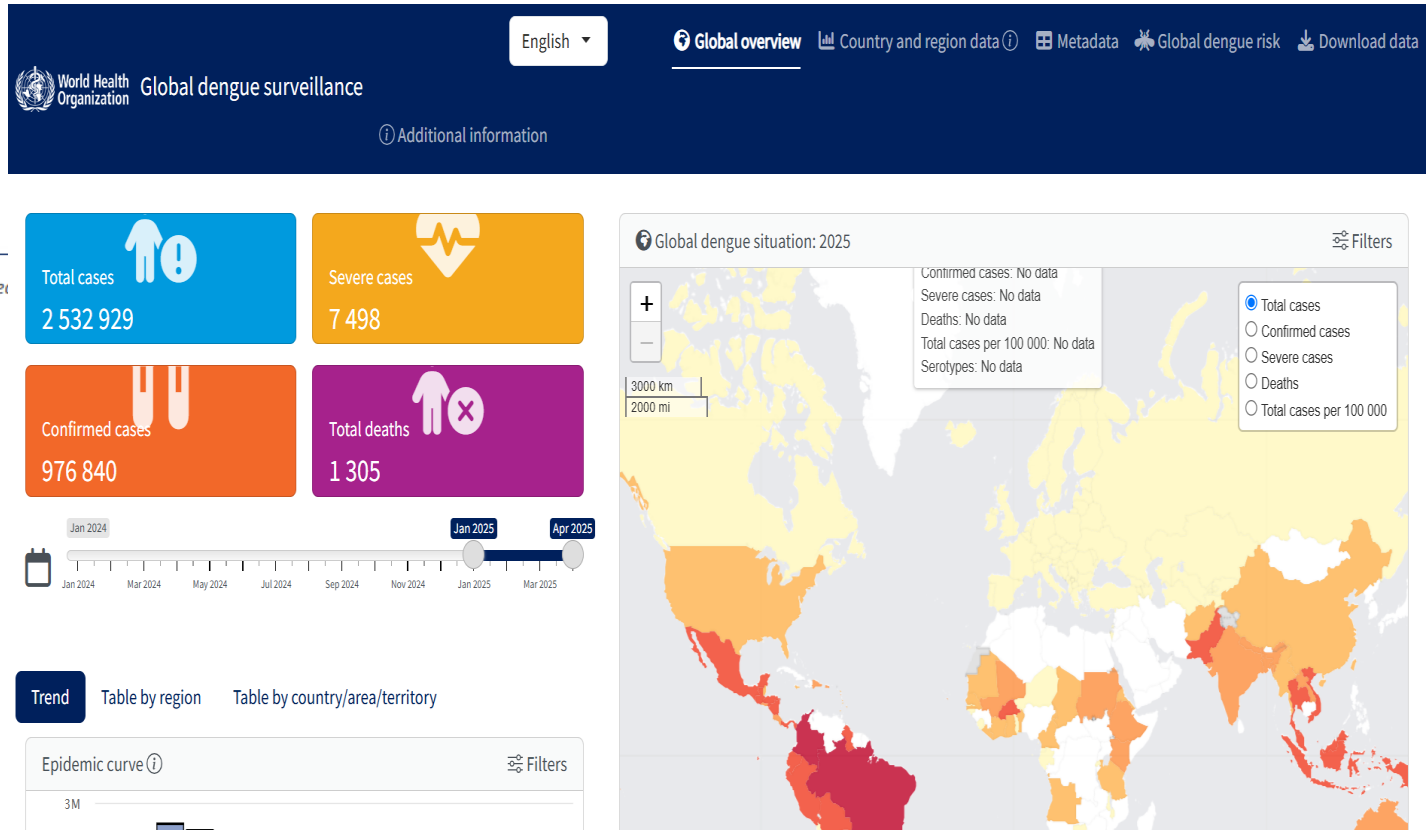


**Note: only 103 countries integrated in the WHO global dengue surveillance system so far are shown*

Co-circulation of dengue, chikungunya and Zika viruses

There is considerable overlap in the geographic distribution of dengue, chikungunya, and Zika viruses, which

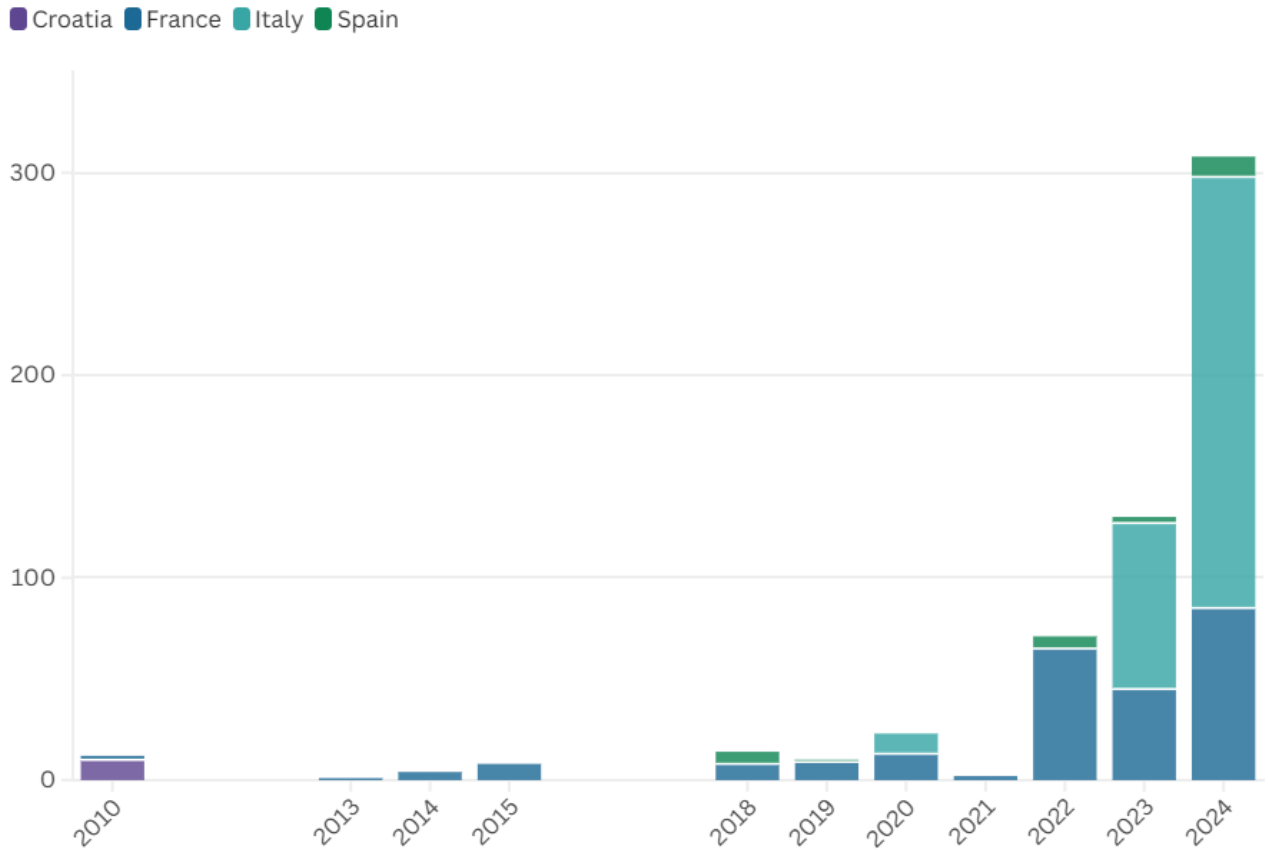
https://worldhealthorg.shinyapps.io/dengue_global/



Background

- Mid June – October 2024
- Dengue - reported by 3 countries: ESP=8, FRA=83, ITA=213;
- Zika - no reported autochthonous cases
- Chikungunya - reported by 1 country: FRA=1 (July)

Cases of autochthonous dengue reported in European Region since 2010, by year



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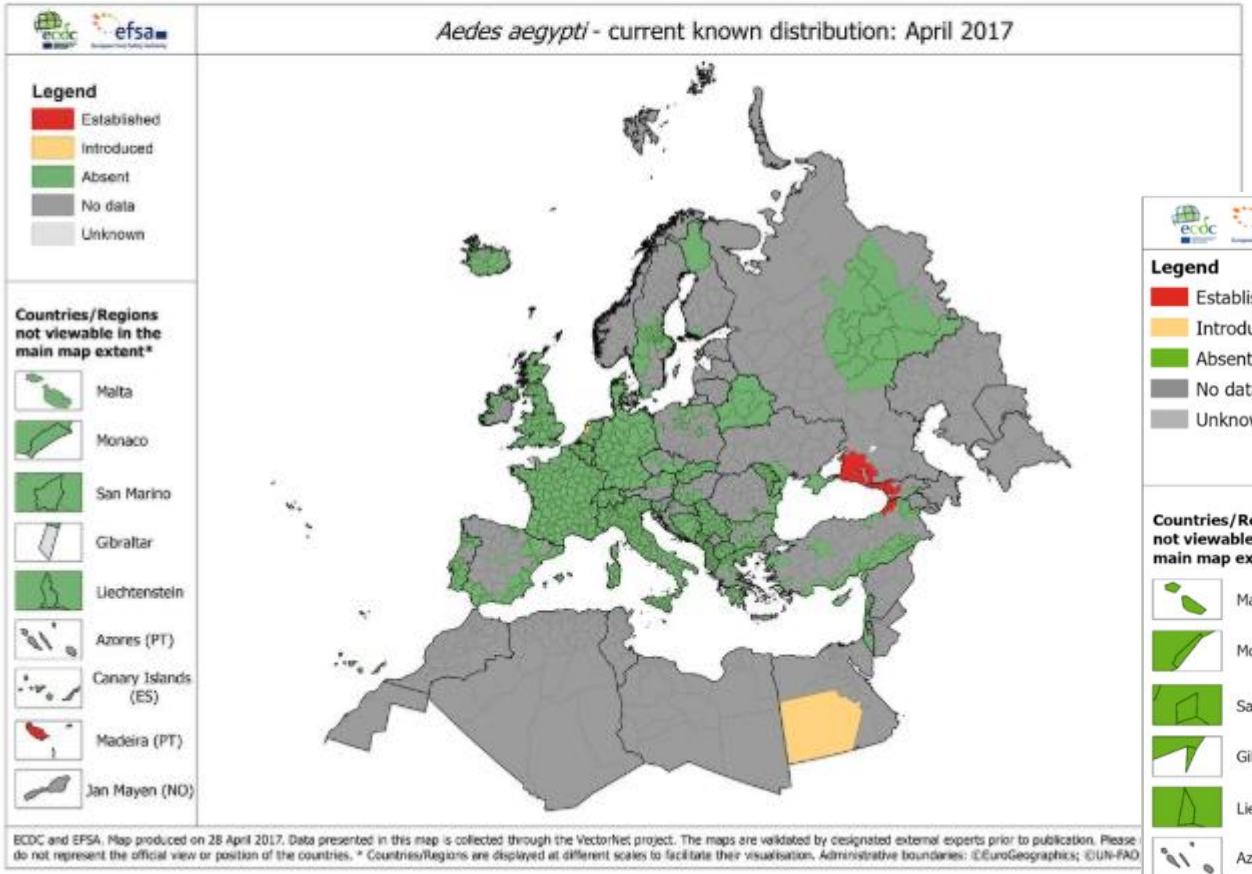
Outbreak in Madeira, PT (2012): 2187 cases

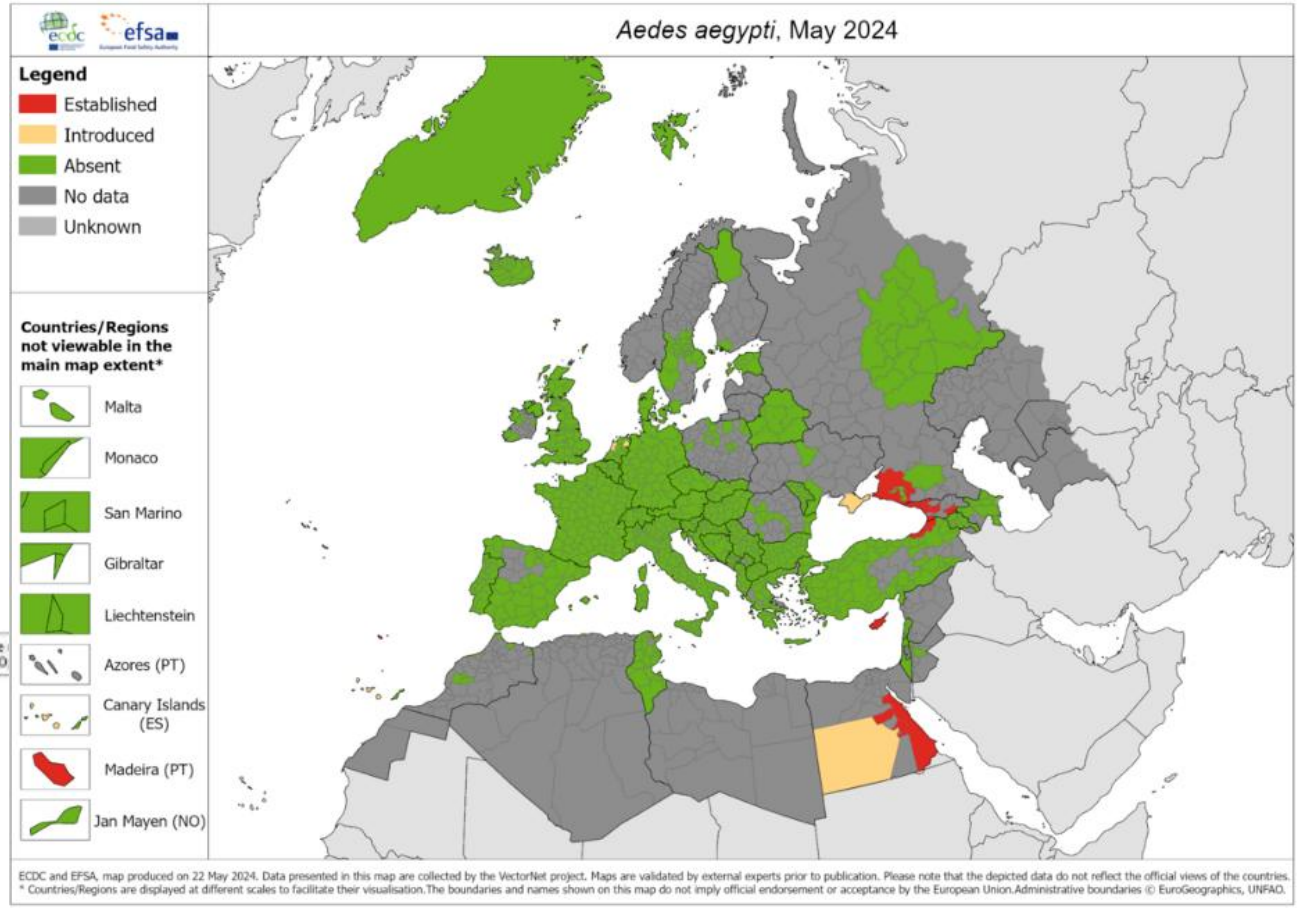
Aedes aegypti - current known distribution in Europe, April 2017

Map

22 May 2017

The map shows the current known distribution of Aedes aegypti in Europe at 'regional' administrative level (NUTS3), as of April 2017.





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European Centre for Disease Prevention and Control and European Food Safety Authority. Mosquito maps [internet]. Stockholm: ECDC; 2024. Available from: https://ecdc.europa.eu/en/disease-vectors/surveillance-and-disease-data/mosquito-maps

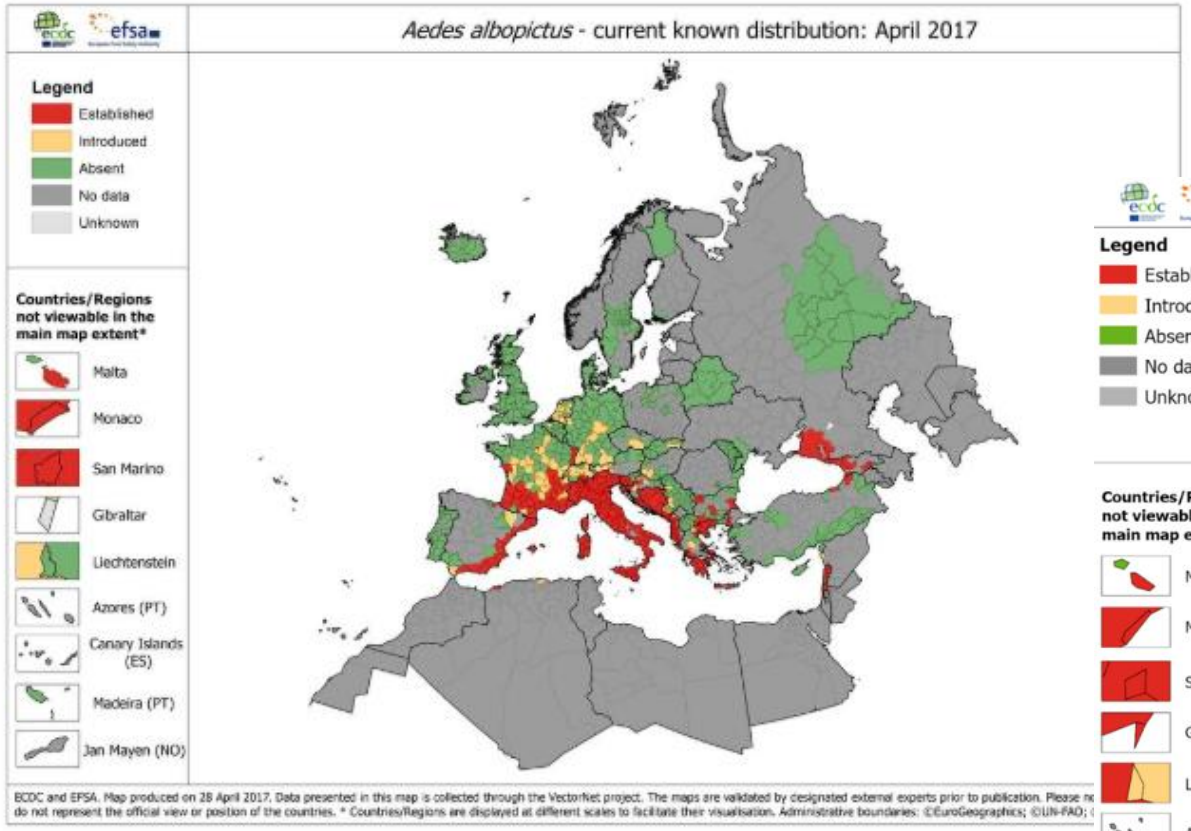
Aedes albopictus - current known distribution in Europe, April 2017

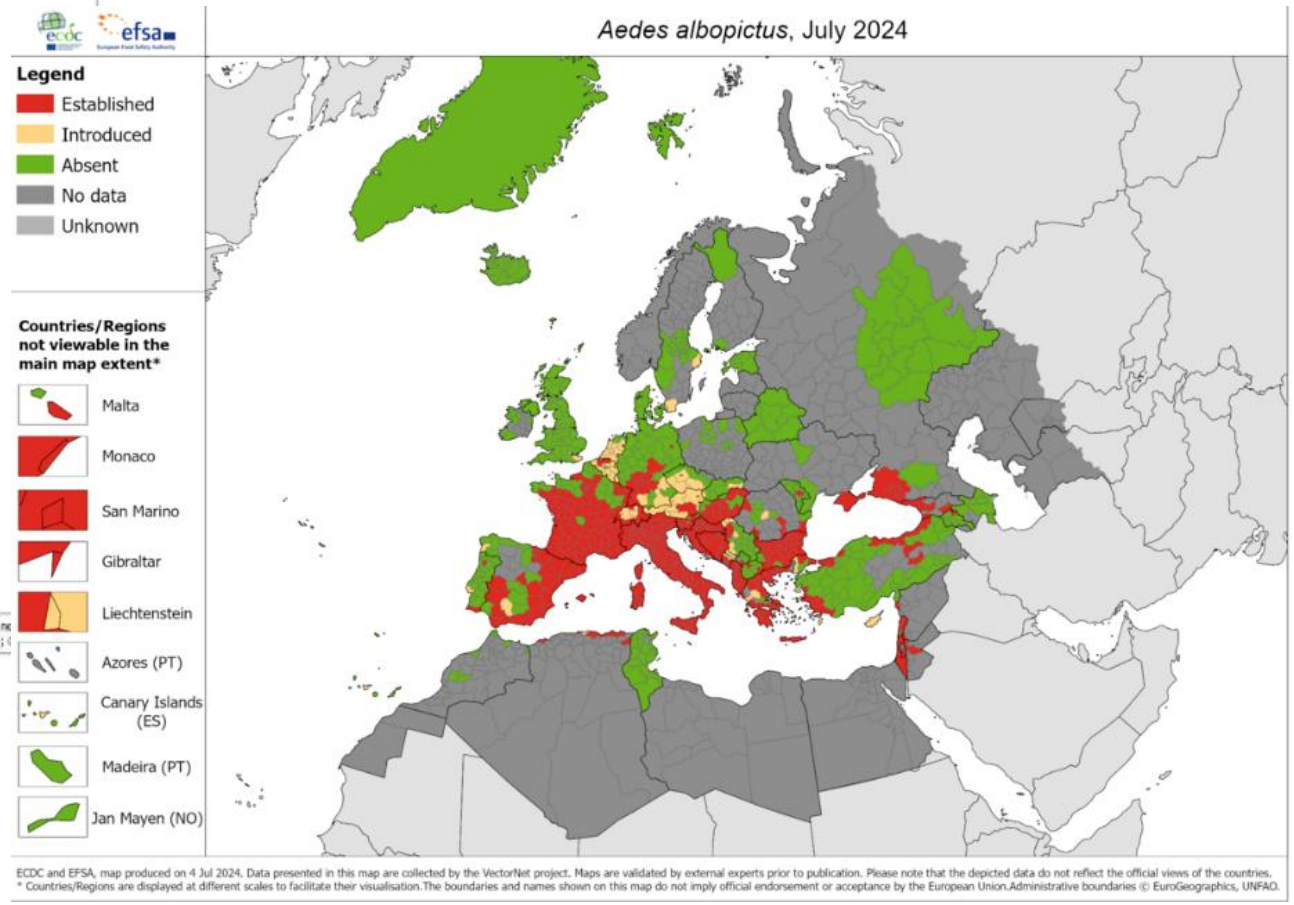
Map

22 May 2017

Period: 01 Oct 2016 - 31 Oct 2016

The map shows the current known distribution of Aedes albopictus in Europe at a 'regional' administrative level (NUTS3), as of April 2017. The VectorNet maps are published regularly on the website to provide the ECDC stakeholders and the general public with the most up-to-date information on vector distribution.





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Scoping Review of literature

i. What is the extent of autochthonous cases/outbreaks of dengue in the WHO European Region since 2008?

ii. What is the serological evidence of the extent of dengue in the WHO European Region since 2008?

PubMed Search terms: dengue, cases, outbreaks, serology, Europe, and countries in the WHO European region at potential risk of autochthonous spread of dengue based on climate suitability and presence of the vector.

Results - 635 articles returned

- Evidence of autochthonous dengue in France, Croatia, Portugal (Madeira), Spain, and Italy
- Serologic evidence from population-based surveys: 3 studies (IgG+PRNT except for Croatia only IgG)
  - France (2015, 0%, 2 months post outbreak), Croatia (2011, 2% 2 years post outbreak) and Madeira (2016, 8%, 4 years post outbreak.
- Evidence from blood donors: 3 studies
  - Two country studies: Turkey (2010, 0.9 % dengue IgG +PRNT; 2010 1.3% dengue IgG+ +IIF)
  - Metaanalysis: Madeira (2012-13, 2.1% samples with RNA)

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Classification of region

- Adapted from AFRO classification of countries according to risk of dengue outbreaks, considering likelihood and impact (consequences). Eight key indicators used to estimate the overall criticality score for each country.
- EURO five indicators:
  - Suitability for survival and establishment of *Ae. albopictus* (*Ae. aegypti*) (1/0)
  - Autochthonous cases since 2010 (1/0)
  - Outbreak since 2010 (1/0)
  - Autochthonous (sporadic) cases recent years - 2022 and 2023 (1/0)
  - Temperature as a limiting factor for dengue transmission (1/0)
- Transmission “suitability” categories calculated based on arithmetic sum of the above

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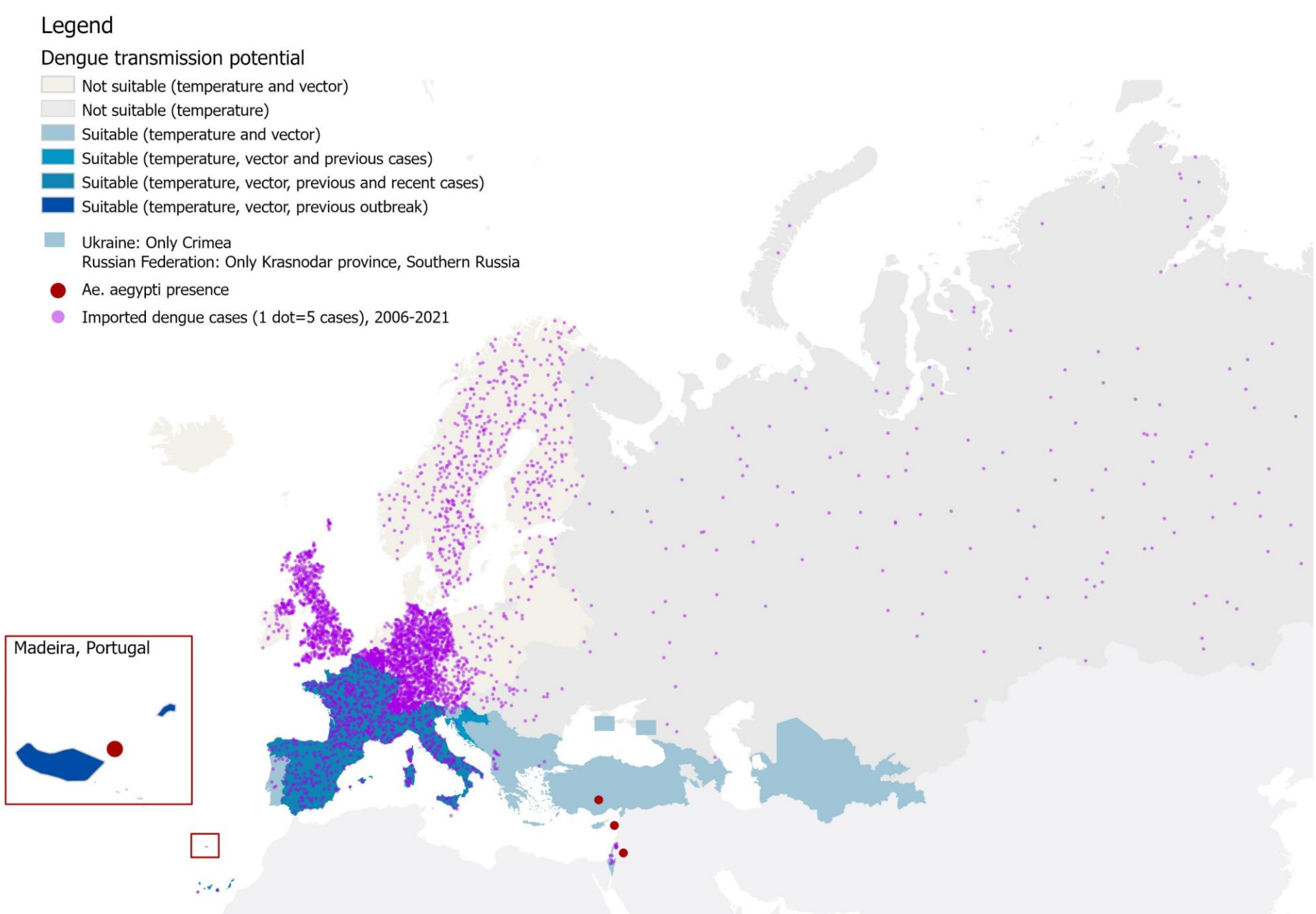
*AFRO indicators excluded from EURO assessment: 1) DALY, 2) CDC dengue risk level (same as recent outbreaks + incomplete data for EURO), 3) global transmission suitability for dengue virus transmitted by *Ae. aegypti*, 4) JRC INFORM Risk (to be replaced in phase two by SPAR indicators), 5) WHO/TDR AFRO Arbovirus Country Capacity score (not available for EURO)

Results



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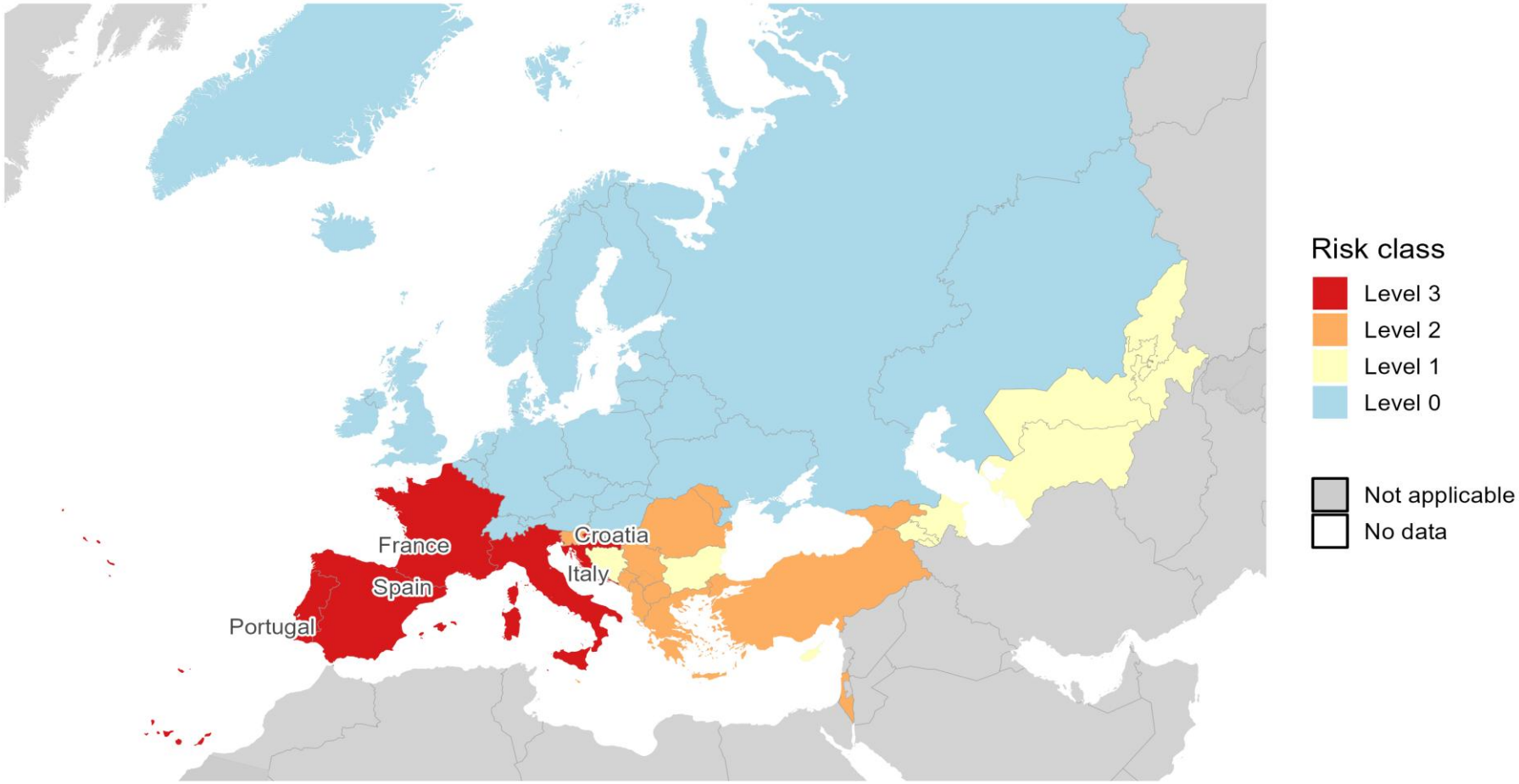
Risk categorization: European Region

Classification	No. of countries
Level 3 (High)	5
Level 2 (Medium)	13
Level 1 (Low)	11



Country names shown for level 3 countries

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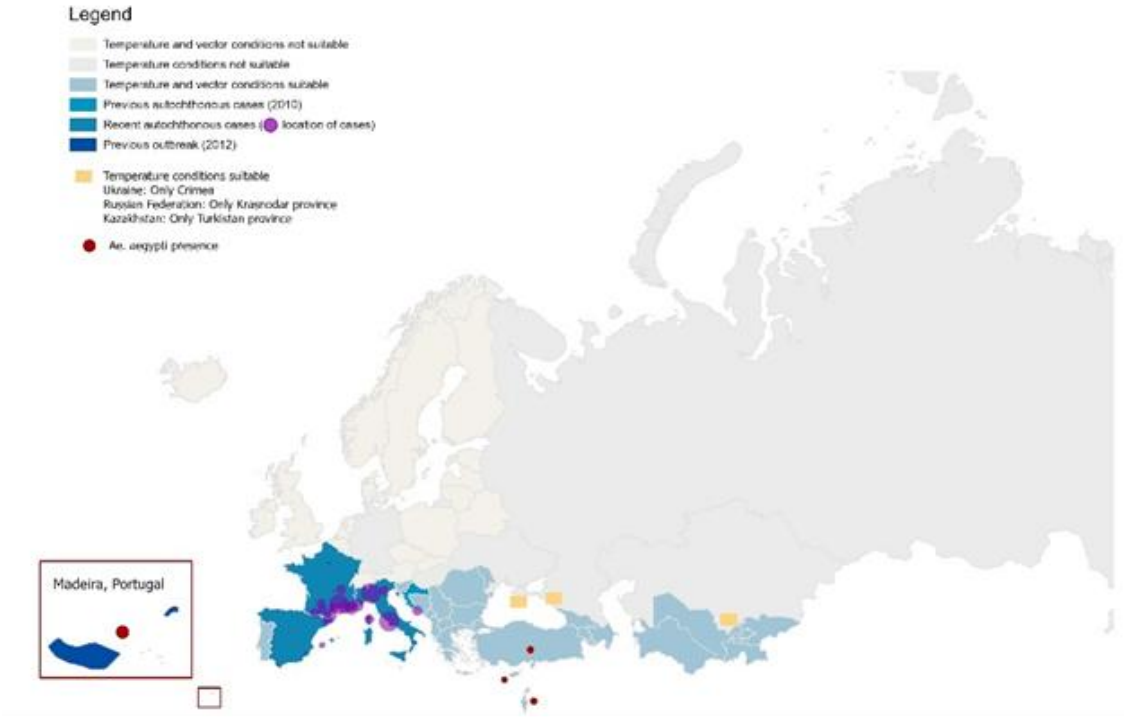
Data source: World Health Organization
Map production: World Health Emergencies Programme

Dengue in the European Region

- Monthly aggregate reporting on dengue, zika and chikungunya requested for **30** countries/areas between 1 June-30 Nov
  - **Ad hoc reporting** of any autochthonous cases as they occur
  - **End of season reporting** of all cases (imported and autochthonous), including zero reporting



- Started in 2024

Please provide aggregated information on Dengue cases by month
*if TOTAL_CASES is 0, no further information is needed

COUNTRY	YEAR	MONTH	PATHOGEN (Dengue/Chikungunya/Zika)	TOTAL_CASES	LAB_CONFIRMED_CASES	TOTAL_AUTOCHTHONOUS_CASES	TOTAL_IMPORTED_CASES	SEVERE_CASES	DEATHS
	2024	JUNE	Dengue						
	2024	JULY	Dengue						
	2024	AUGUST	Dengue						
	2024	SEPTEMBER	Dengue						
	2024	OCTOBER	Dengue						
	2024	NOVEMBER	Dengue						

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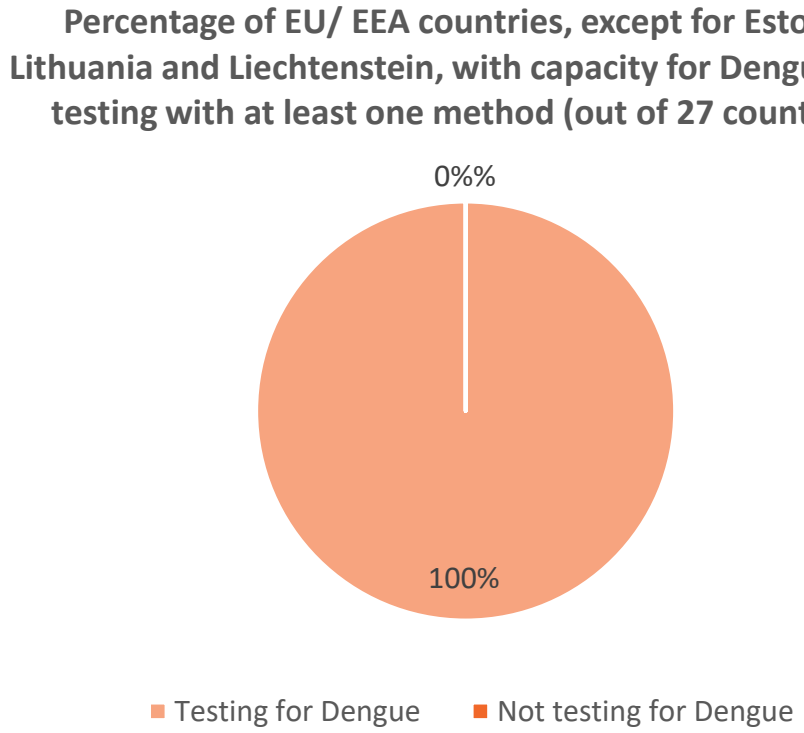
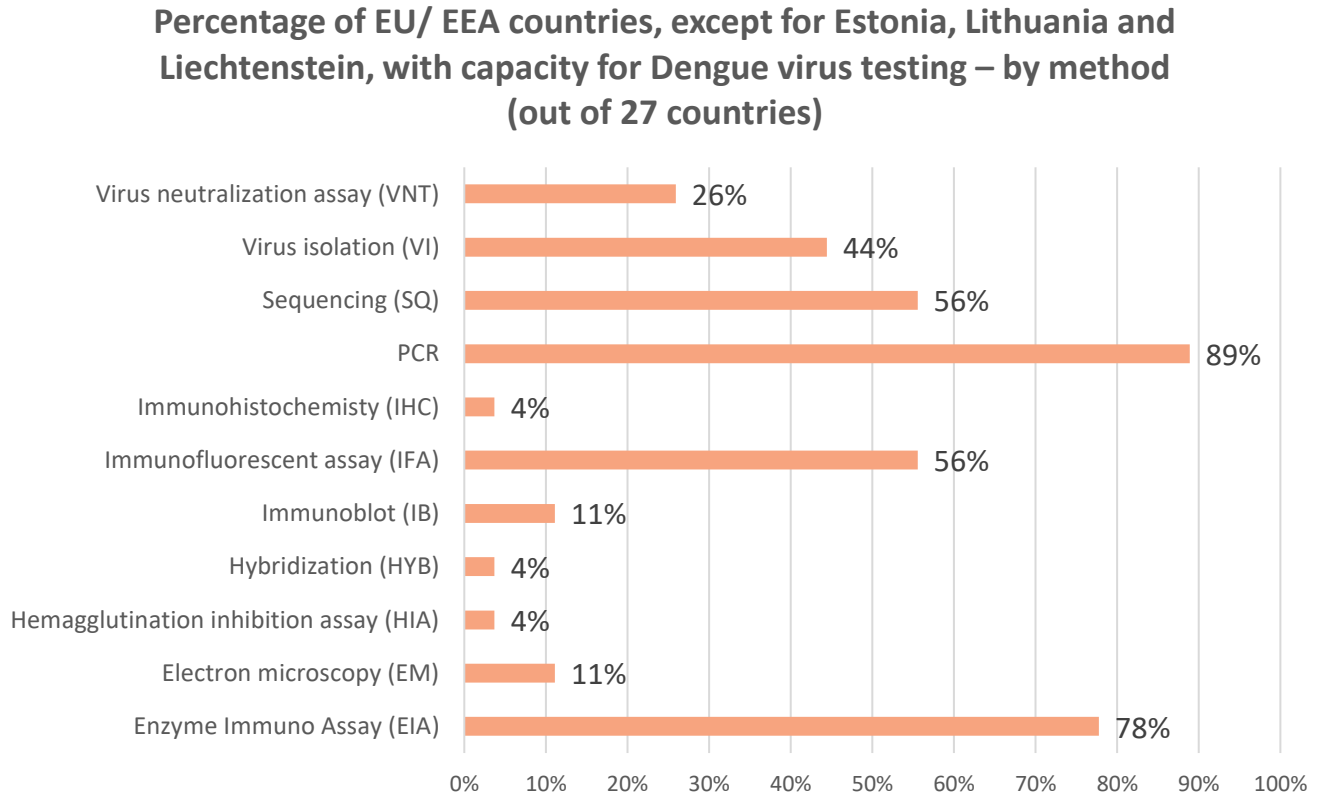
European Union (EU)/European Economic Area (EEA), (except for Estonia, Lithuania and Liechtenstein*) – testing capacities for Dengue





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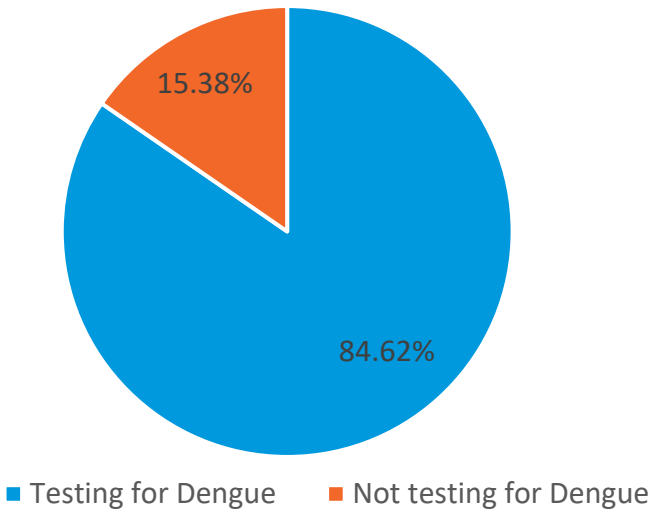
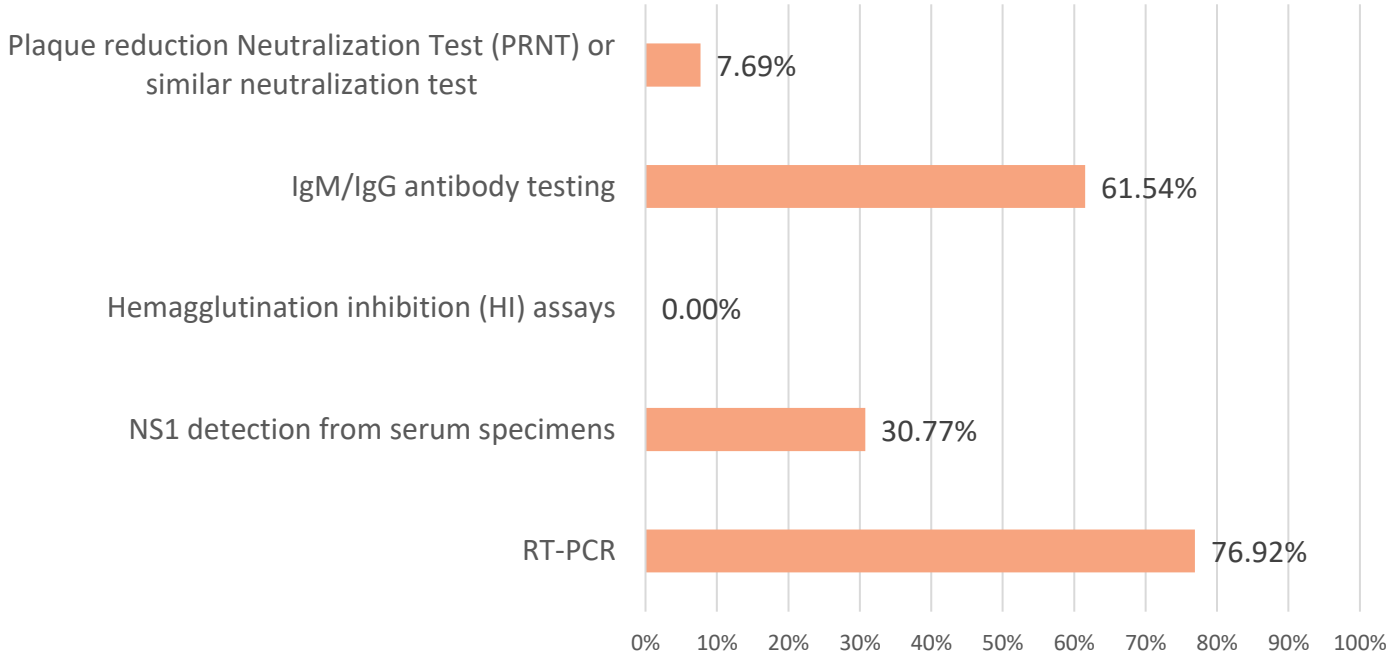
Source: Directory of EVD-LabNet
https://qap.ecdc.europa.eu/public/extensions/EVD_LabNet/EVD_LabNet.html#main-tab
*Data for Estonia, Lithuania and Liechtenstein are not available

Balkan Hub, Caucasus Hub and Central Asia Hub countries, except Kazakhstan, Tajikistan and Uzbekistan* – testing capacities for Dengue

Percentage of Balkan, Caucasus and Central Asia countries, except for Kazakhstan, Tajikistan and Uzbekistan, with capacity for Dengue virus testing with at least one method (out of 13 countries)



Percentage of Balkan, Caucasus and Central Asia countries, except for Kazakhstan, Tajikistan and Uzbekistan, with capacity for Dengue virus testing - by method (out of 13 countries)



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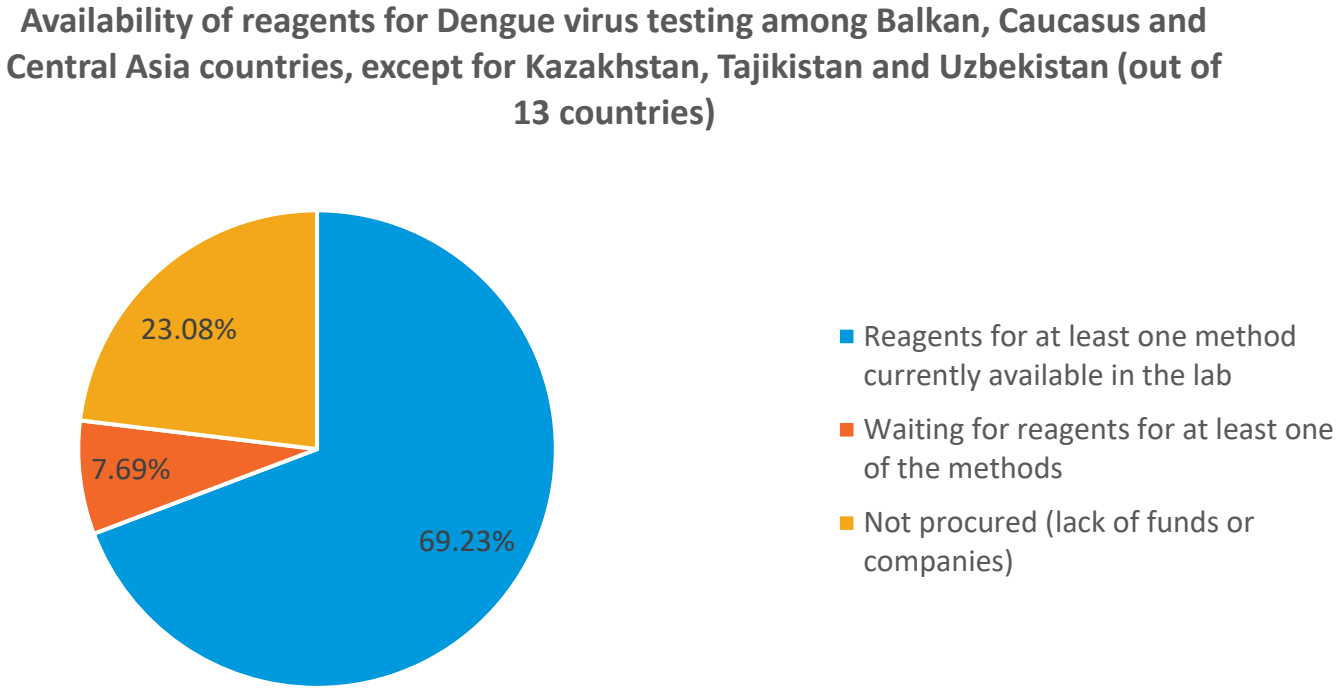
Source: WHO Balkan Hub and WHO country offices for other countries
*No response received

Balkan Hub, Caucasus Hub and Central Asia Hub countries, (except Kazakhstan, Tajikistan and Uzbekistan*) – availability of reagents for Dengue



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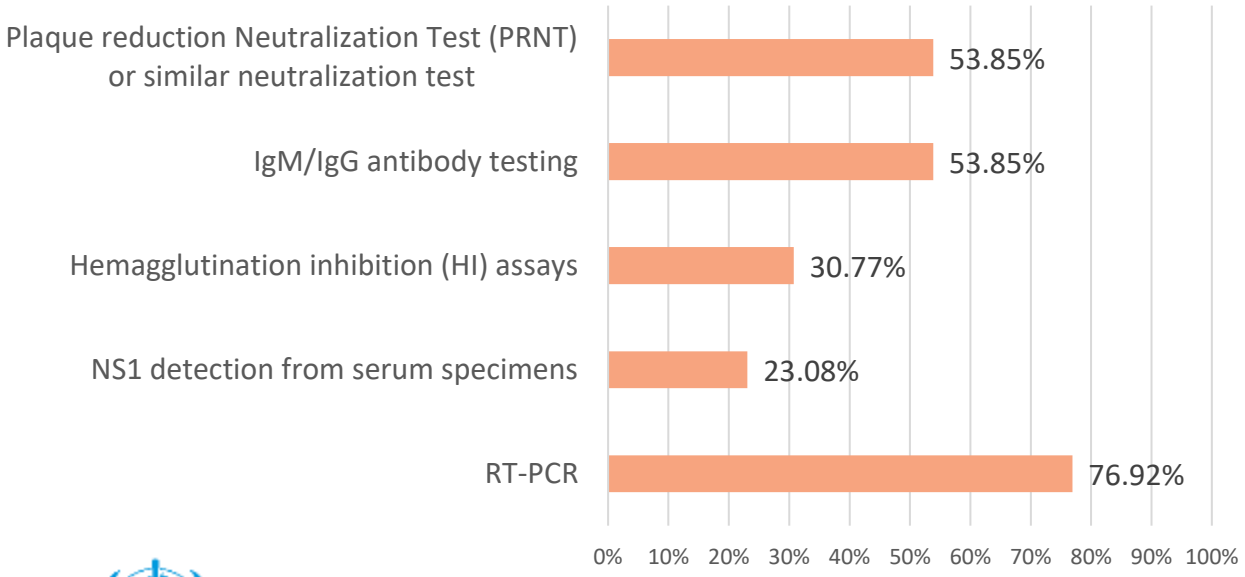
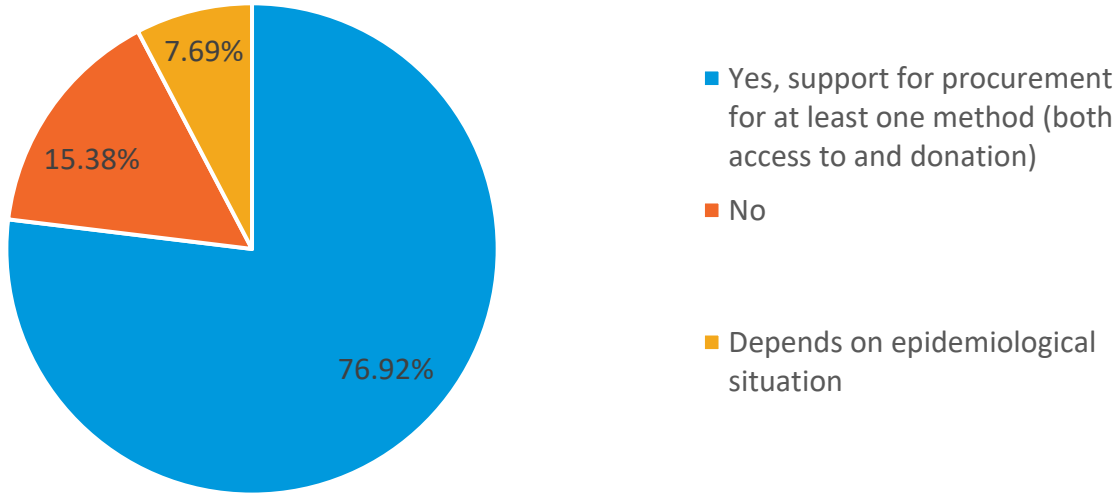
Source: WHO Balkan Hub and WHO country offices for other countries
*No response received

Balkan Hub, Caucasus Hub and Central Asia Hub countries, (except Kazakhstan, Tajikistan and Uzbekistan*) – requested support for Dengue

Percentage of Balkan, Caucasus and Central Asia countries, except for Kazakhstan, Tajikistan and Uzbekistan, requesting training support for Dengue virus testing - by method (out of 13 countries)



Percentage of Balkan, Caucasus and Central Asia countries, except for Kazakhstan, Tajikistan and Uzbekistan, requesting support in procurement for at least one method (out of 13 countries)



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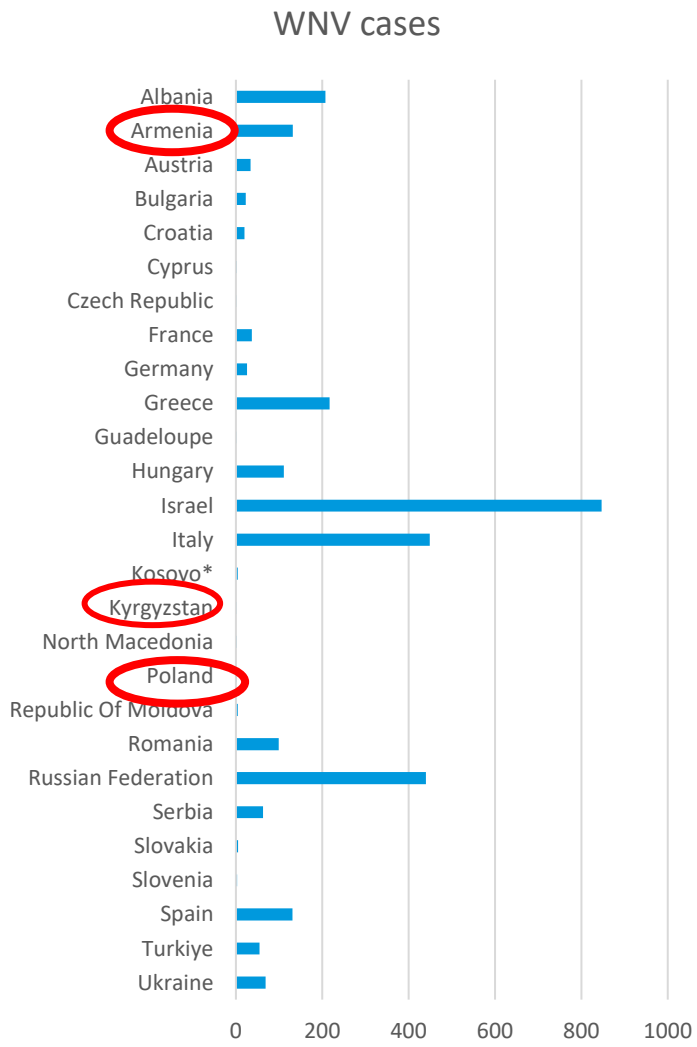
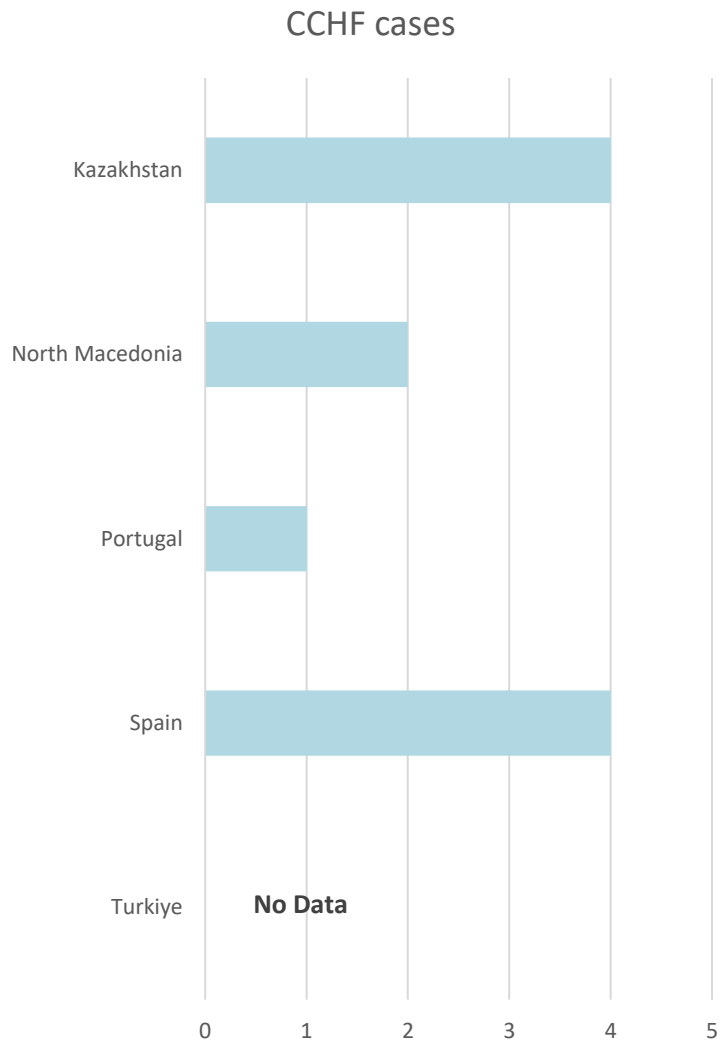
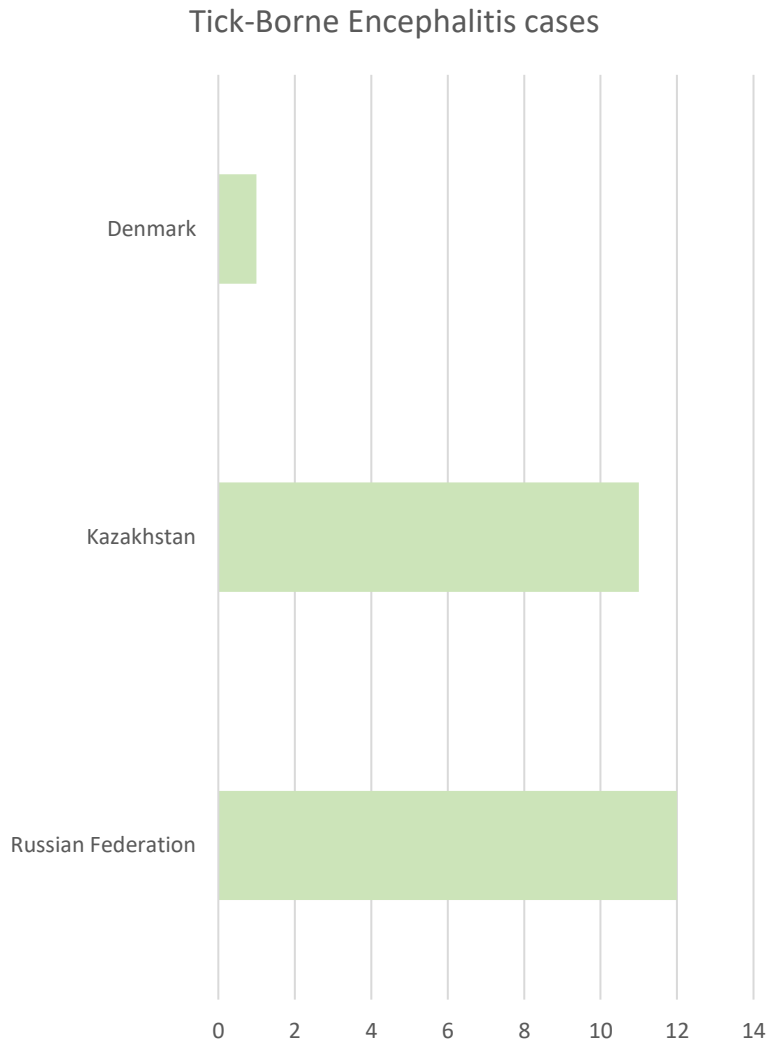
Source: WHO Balkan Hub and WHO country offices for other countries
*No response received

Detection of WNV, CCHF, TBE in the European Region, 2024

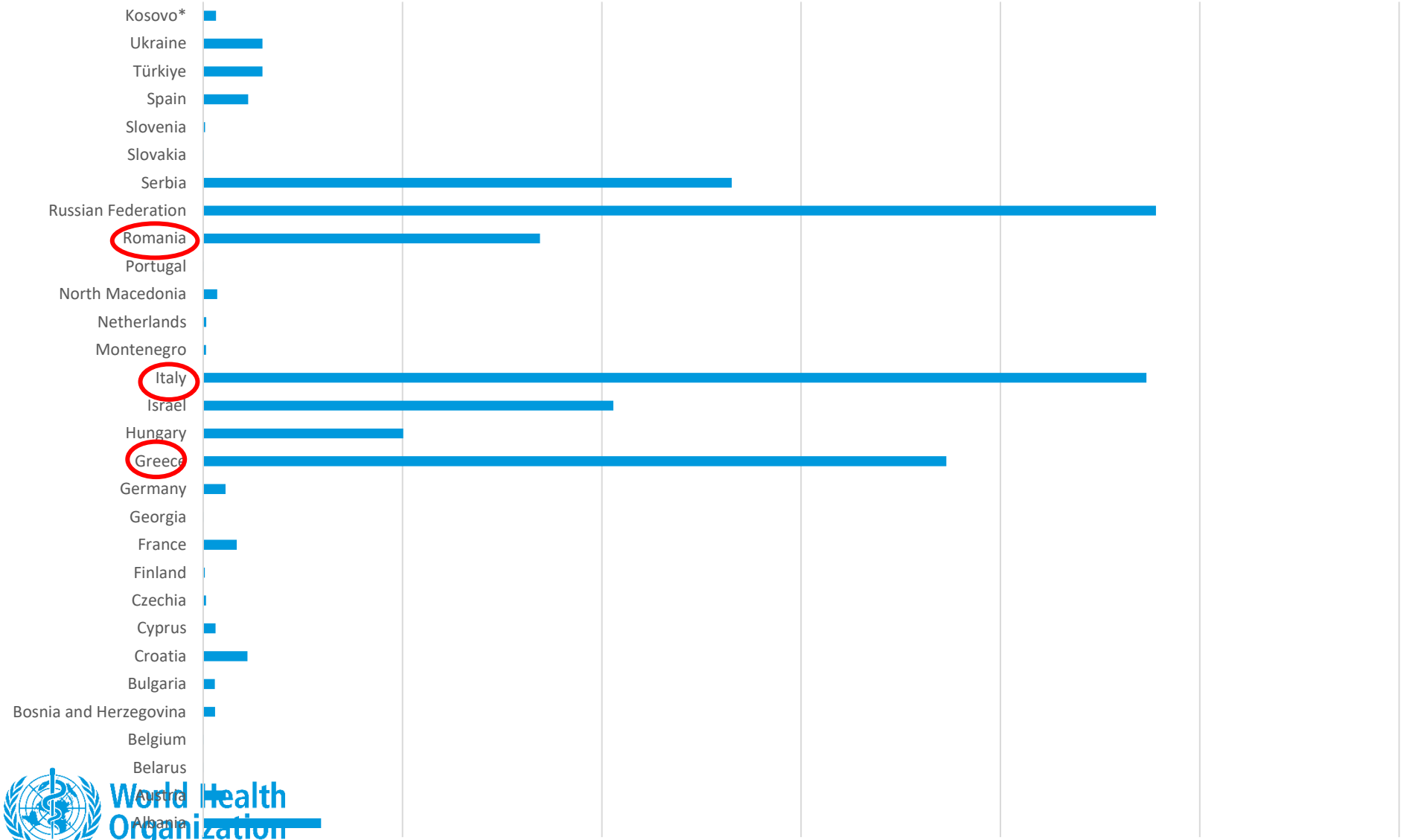
Captured through IHR and EIOS surveillance







Autochthonous human WNV cases reported to WHO from 2006-2023



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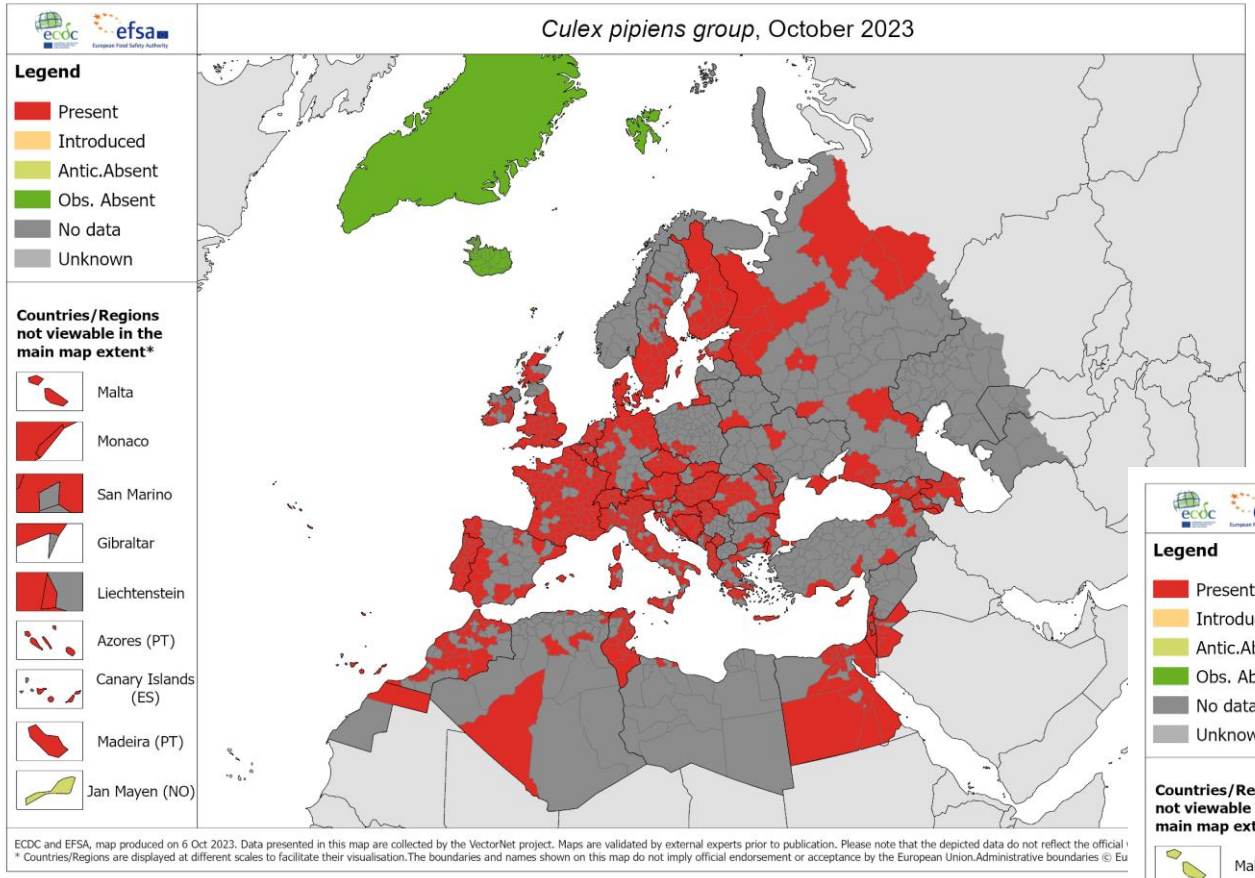
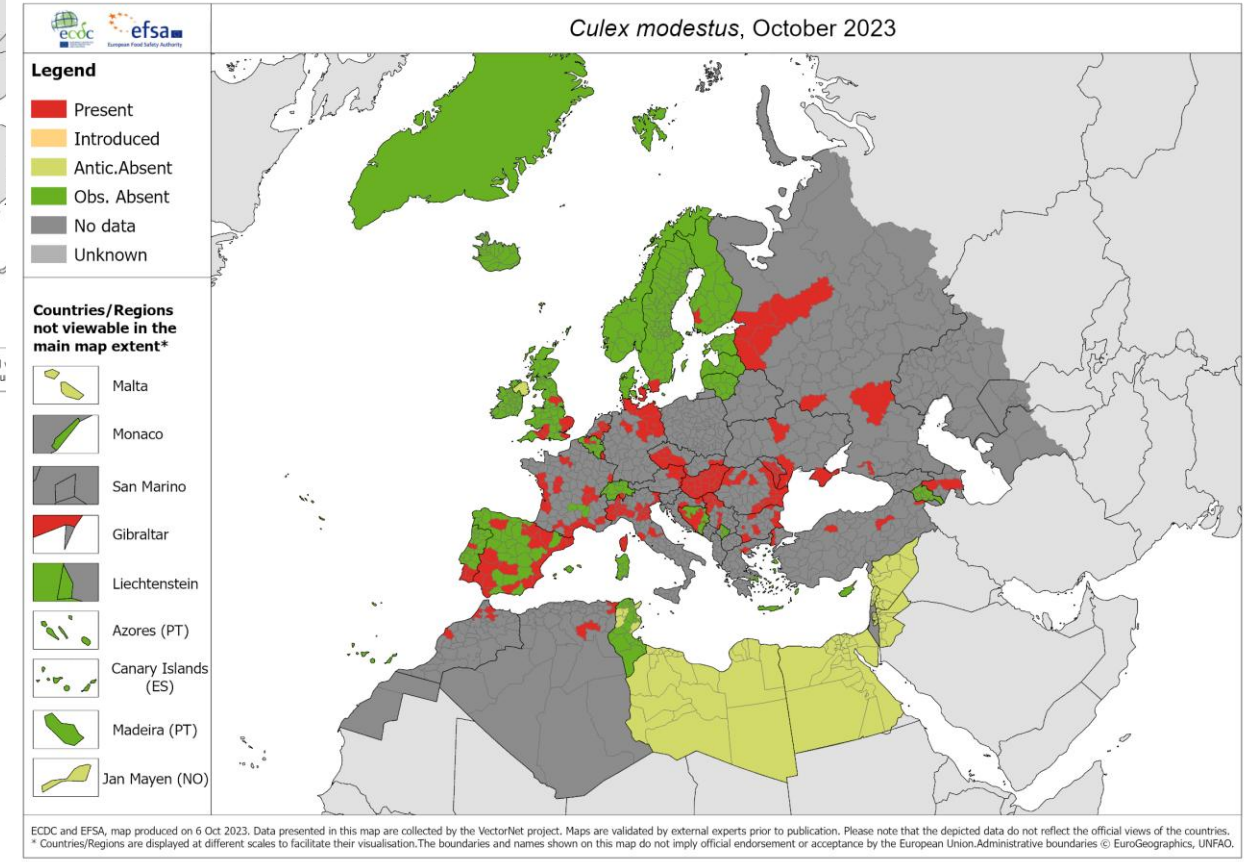
*All references to Kosovo in this document should be understood to be in the context of the United Nations Security Council resolution 1244 (1999).

Main WNV vectors in Europe





European Centre for Disease Prevention and Control and European Food Safety Authority. Mosquito maps [internet]. Stockholm: ECDC; 2023.
Available from: https://ecdc.europa.eu/en/disease-vectors/surveillance-and-disease-data/mosquito-maps

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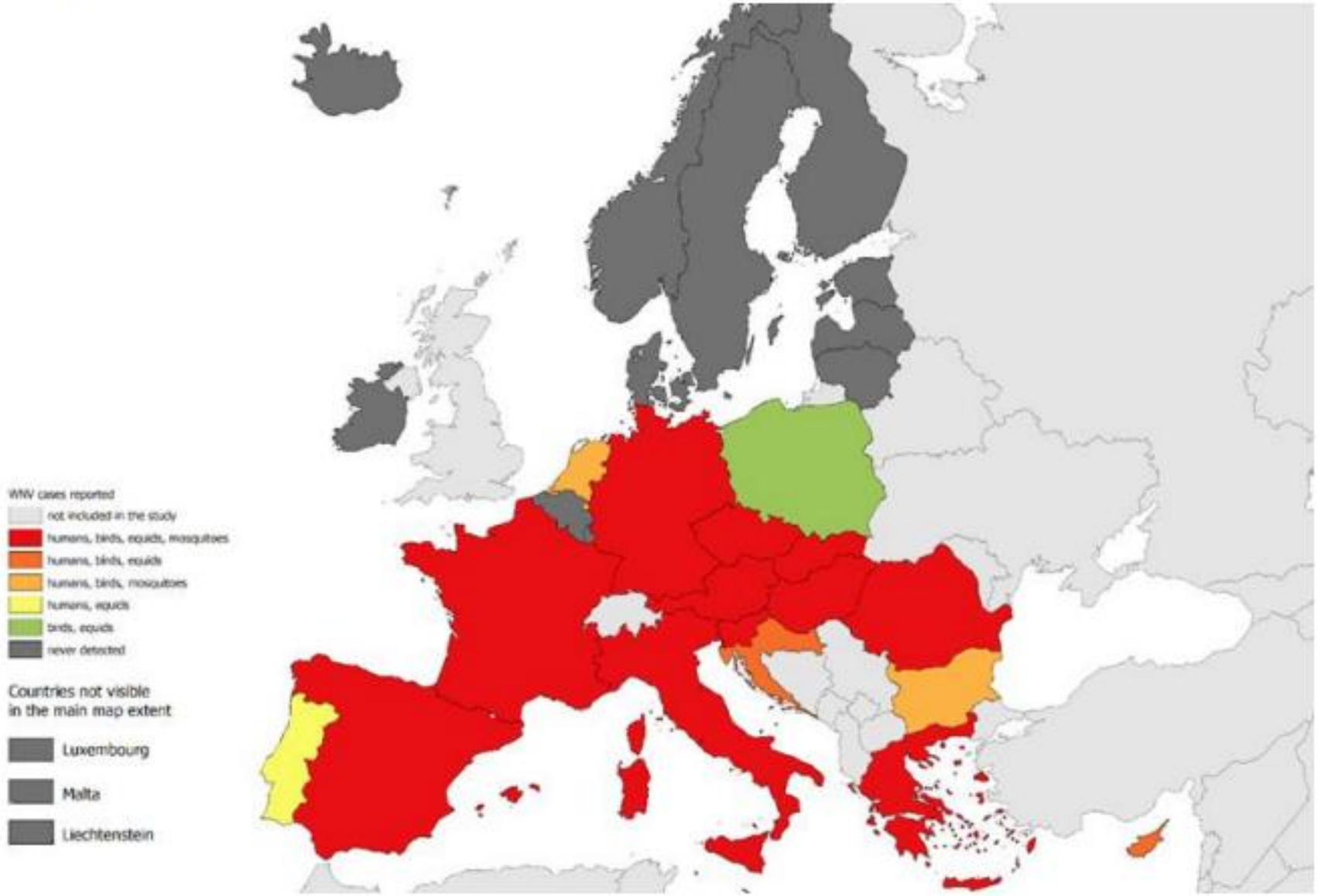
Figure 3. West Nile virus infections in humans, animals (birds-equids) and mosquitoes in the EU/EEA, 2012-2021



Geographic spread of WNV infections in the EU/EEA

European Centre for Disease Prevention and Control, European Food Safety Authority, Surveillance, prevention and control of West Nile virus and Usutu virus infections in the EU/EEA. Stockholm: 2023. Available from: Surveillance_prevention_and_control_of_WNV_and_Usutu_virus_infections_in_the_EU-EEA.pdf

Investigating seasonality

- WNV is currently arbovirus with the **widest geographic distribution**
- Over the two past decades: **geographical expansion** with upsurge in cases and outbreaks reported across the WHO European Region
  - Currently: endemic in some countries in the Region, sporadic detections in others
  - Exceptional peak of cases recorded in 2018
- Transmission season when vector is active; **typically June-November**
  - In recent years: **extended transmission period** was observed, with human cases reported as early as March up until late October.
- **Climatic factors influence transmission**, including **ambient temperature** (positive seasonal abnormalities) and **precipitation**
  - Likely there will be further spread of the disease in the coming summer period, due to the favourable conditions for vector and virus activity
  - Due to rising of the ambient temperature in the Region, it is expected that the incidence of human infections and outbreak risk will continue to increase in future years
- **Retrospective collection of WNV seasonal weekly data** and **scoping literature review** to gain insight into seasonality and inform surveillance and response strategies

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Malaria

- Study from 2012 to 2023
- 299 cases of malaria – most imported
- 9 cases with no travel history - both P vivax and P falciparum
- No locally acquired cases reported since 2010
- Turkey only country in 53 member state region where malaria has not been certified as eradicated

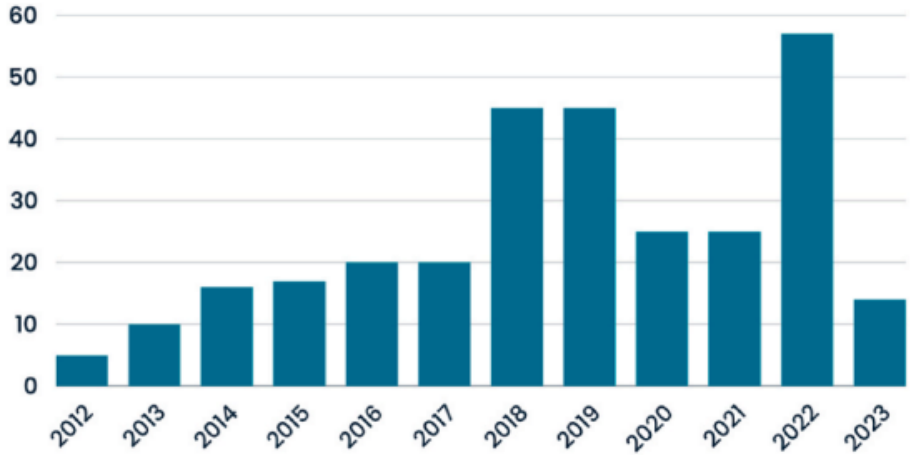

Fig. 2. Number of patients diagnosed with Malaria by years.

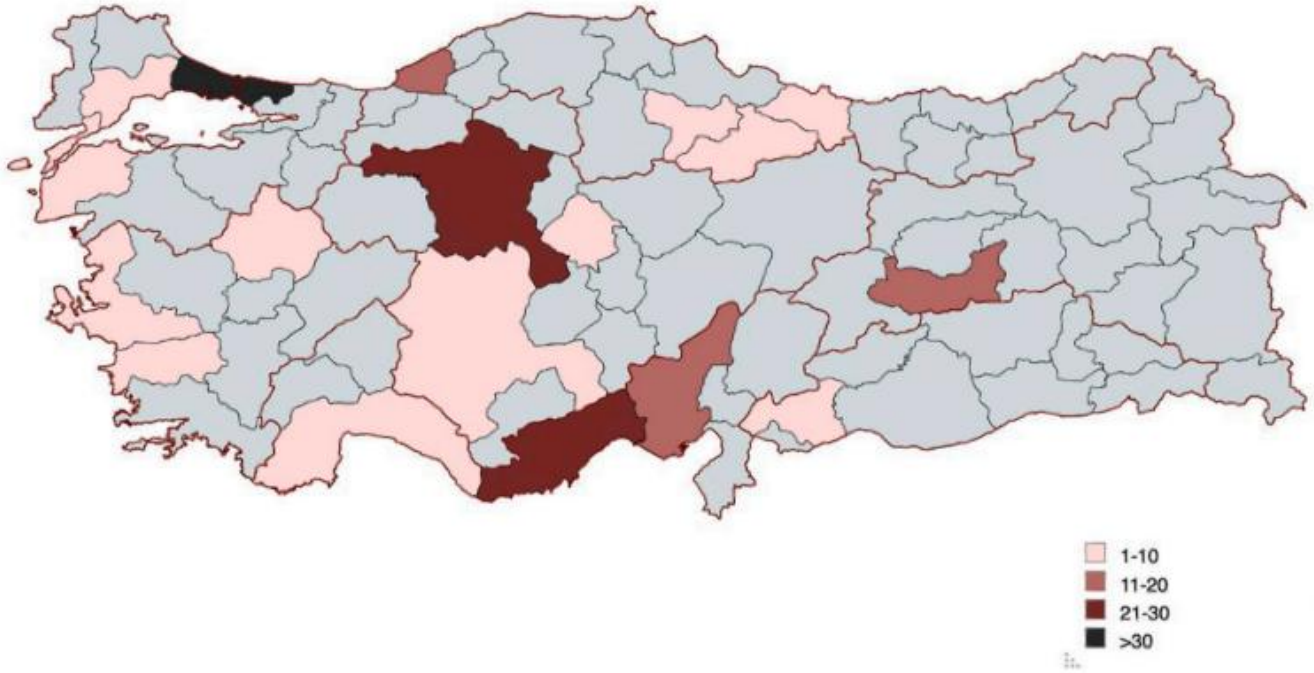

Fig. 1. Geographical distribution of malaria cases included in this study across provinces in Turkey by a color-coded map.

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Sahin et al. Travel Medicine and Infectious Disease Volume 64, March–April 2025, 102819

Next steps

- Continue surveillance for Dengue, Chikungunya and Zika for monthly reported cases of local transmission –from June to beginning of December
- All cases imported and local are reported annually to WHO
- Engage partners such as ECDC and VectorNet to aim to model expected dengue frequency in areas with ecologic conditions for local transmission
- Analysis of seasonality of West Nile Virus and possible underreporting by comparing literature review and risk assessment results.
- May expand reporting to West Nile Virus
- Work with colleagues at WHO HQ and in Europe to promote better risk assessment of arboviruses in the region

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Thank you for your attention

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