



EPIDEMIOLOGICAL SURVEILLANCE REPORT

Malaria in Greece, 2019, up to 29/11/2019

Introduction

Greece was declared free from malaria in 1974, following an intense control program (1946- 1960). Since then, several (20-110 cases) imported cases are reported annually to the Hellenic National Public Health Organization in Greece (NPHO)/ former Hellenic Center for Disease Control & Prevention (HCDCP) referring to patients infected abroad (returning travelers or migrants from malaria endemic countries). Increasing number of imported malaria cases are expected due to the increase of global travel and population movements, a phenomenon that is observed in all developed countries.

Additionally, since 2009 a number of locally acquired/introduced *P. vivax* malaria cases have been recorded in various areas of the country (i.e., among patients without travel history to a malaria endemic country), mainly as sporadic introduced cases but also in clusters (in 2011- 2012).

You can find more information regarding epidemiological malaria data at the NPHO website (www.eody.gov.gr).

Malaria surveillance data, Greece, 2019, until 29/11/2019

In 2019, up to 29/11/2019, a total of thirty five (35) laboratory diagnosed and confirmed malaria cases have been reported to the NPHO (Table 1): 33 cases were classified as imported (i.e., were infected abroad), and two *P.vivax* malaria cases were classified as introduced.

Among the 33 imported cases, 18 were immigrants from malaria endemic countries (12 from the Indian Subcontinent/ South Asia and 6 from Africa) and 15 cases were travellers (13 from Africa and 2 from the Indian Subcontinent/ South Asia).

Two (2) *P.vivax* cases were classified as introduced (1st generation of transmission). Case investigation of these introduced cases suggested the following:

- One *P.vivax* case was probably exposed at the Municipality of Farkadona, Regional Unit (RU) of Trikala, in Thessaly Region. The patient had onset of symptoms in week 17/2019 (22-28/04/2019). It seems likely that the patient was infected during the previous season 2018. An introduced *P.vivax* case was previously recorded in the same area in 2015.
- One *P.vivax* case (likely infected within the country) was probably exposed at the Municipality of Pydna-Kolindros, Regional Unit (RU) of Pieria, in Central Macedonia Region. The patient had onset of symptoms in week 38/2019 (16-22/09/2019). In addition, one patient was detected in the same area, with malaria compatible clinical and laboratory presentation and with an epidemiological link with the confirmed malaria case, which was not laboratory confirmed (according to the EU case definition) and was characterized as a “probable” case (this case is not included in the total number of cases).

Table 1. Malaria cases by epidemiological classification, status and *Plasmodium* species, Greece, 2019, up to 29/11/2019 (n=35)

Epidemiological classification and status		<i>P.vivax</i>	<i>P.falciparum</i>	<i>P.ovale</i>	<i>P. non-falciparum-</i>	Σύνολο
Imported cases	Immigrants	13	4	0	1	18
	Travelers	1	12	2	0	15
Introduced cases		2	0	0	0	2

Activities for the management of malaria

Since 2012, NPHO has developed and continuously implements an Action Plan for the Management of Malaria. In addition, in 2015 the Ministry of Health published the “National Action Plan for the Management of Malaria”.

According to these plans, a series of activities are implemented nationwide for the prevention and management of malaria, with the collaboration of national, regional and local authorities:

I. Risk assessment for the re-emergence of malaria: All areas (Regions, Municipalities) are assigned a Risk Level from 0-3, taking into consideration the locally acquired/ introduced malaria cases reported since 2009, and other local risk factors (entomological, environmental and demographic data). The area Risk Level defines the activities to be implemented.

II. Enhanced malaria surveillance and intervention activities:

- **Case finding:** In order to promptly detect all malaria cases, awareness raising among local health professionals and active case detection activities in high risk areas are implemented, as well as support for the laboratory diagnosis of malaria.
- **Case investigation:** NPHO investigates all notified malaria cases. For locally-acquired/ introduced cases, an in-depth interview with the patient is conducted, in order to identify the estimated place of exposure and the risk for further local transmission.
- **Immediate communication to stakeholders and health professionals** at national and local levels, after the reporting of each locally-acquired/ introduced malaria case to the NPHO:
 - i. Hierarchy of the Ministry of Health (MoH),
 - ii. Regional public health authorities,
 - iii. Municipalities,
 - iv. MoH Committee for the Prevention and Management of Tropical Diseases,
 - v. Working Group for the designation of vector-borne disease (VBD) affected areas,
 - vi. Hellenic National Blood Transfusion Center, responsible for the relevant blood safety measures,
 - vii. Physicians practicing in the affected area, to raise their awareness for investigating suspect cases.
- **Focus investigation – reactive case detection:** NPHO investigation teams are deployed after the notification of each locally acquired/ introduced case to perform a “focus investigation”, in an area indicated by the epidemiological, entomological and environmental investigation. In this activity, all

individuals in the focus are screened for malaria compatible symptoms and tested for malaria accordingly. Following the reports of the two introduced malaria cases in 2019, the NPHO, in collaboration with local public health authorities, organised and performed focus investigation, as well as communication activities for health professionals and the public in the areas.

- **Environmental and vector investigation** is performed in the area after the recording of each locally acquired malaria case (or imported case in a receptive area), in collaboration with regional and local authorities, in order to identify *Anopheles* breeding sites and other risk factors for local transmission.
- **Proactive malaria case detection (PACD) in Evrotas Municipality, Lakonia:** The NPHO/ former HCDCP, in collaboration with the Region of Peloponnese, the Municipality of Evrotas, the University of Thessaly (www.malwest.gr) and Doctors Without Borders (2012), supported from 2011-2014 a field team in the area for the active detection of malaria cases. Since 2015, the field team -with staff from the University of Thessaly and field coordination from the NPHO- is supported by the Region of Peloponnese to continue the PACD programme, undertaking also the radical treatment and focus investigation of all recorded malaria cases. A significant number of migrants from malaria endemic countries (mainly Pakistan) live and seasonally work in Evrotas. During the field visits, health promotion information is provided for protection against mosquitoes and fever screening and/or testing for malaria is performed regularly. Since April 2019, fever screening visits are performed every 7-15 days in migrants and other high risk groups in the particular area.

- III. Enhancing laboratory diagnosis of malaria:** Since 2012, NPHO has distributed Rapid Diagnostic Tests (RDTs) for malaria to Hospitals and Health Centers in areas with recently recorded malaria transmission, and in areas with large populations of immigrants from endemic countries (i.e., large urban centers, in refugee/migrant camps and the nearby Health Units), aiming at prompt diagnosis and treatment of malaria cases. In 2017 and 2018, NPHO provided RDTs to a total of >180 Health Units/facilities, and in 2019 has already sent new RDTs to >130 Health Units/ facilities, nationwide. RDTs have contributed significantly to the early detection of malaria cases in our experience and have been proven a valuable field tool.

In addition, NPHO recommends the transportation of samples from any laboratory in Greece to the reference laboratory (Department of Parasitology, Entomology and Tropical Diseases of the School of Public Health, University of West Attica) for verification of diagnosis and further identification (and genotyping) of *Plasmodium* species.

- IV. Case management - Standardization of the malaria treatment in Greece,** according to treatment guidelines developed by the NPHO with the input of experts in infectious diseases. NPHO infectious diseases specialists are available for counseling. NPHO also maintains a stockpile of anti-malarial medicines (e.g., the national stockpile of artesunate for parenteral injection for severe cases) for timely distribution to Health Units in cases of emergency.
- V. Increase awareness amongst health professionals** for the diagnosis and management of malaria. NPHO staff delivers presentations and organizes seminars -as necessary- for health professionals in Health Centers/Hospitals in areas with recently recorded locally acquired cases. NPHO communicates annually to all hospitals about malaria.
- VI. Communication to the public** on malaria and personal protection measures against mosquitoes:
- **Educational material** on malaria and protective measures against mosquitoes is available on the NPHO website.

- **Information material** (leaflets, posters) is distributed according to the needs. In areas with introduced cases recorded, the NPHO field team informs the local population, and raises awareness about malaria and the necessary protective measures against mosquitoes, during the focus investigations.

VII. Designation of affected areas - Blood safety and haemovigilance measures: An inter-sectoral Working Group (WG) on the designation of VBD affected areas (under the MoH Committee for the Prevention and Management of Tropical Diseases) considers all available epidemiological and laboratory data for each locally-acquired/ introduced case and decides on the characterization of malaria affected areas in Greece. This designation is then used by the Hellenic National Blood Transfusion Center to issue guidance on blood safety. The list of affected municipalities is published on our website (www.eody.gov.gr) and updated regularly according to recorded locally acquired cases. Post donation and post transfusion information to donors and other haemovigilance measures are in place following relevant guidance from the Coordinating Haemovigilance Centre/ NPHO.

VIII. Vector surveillance and control activities:

- **Raising awareness and guidance to Regional Authorities:** NPHO communicates regularly (workshops, meetings, letters and technical guidance) with all Regional Authorities in Greece recommending the timely planning, organization and implementation of integrated vector control programmes particularly in high risk areas. NPHO sent relevant awareness letters in January 2019 underlying the high risk areas, and recommending the intensification of vector control in areas with risk factors for local transmission. In addition, following an initiative of the General Secretary of Public Health, Ministry of Health, workshops of the national and regional public health authorities were organized and performed in May 2019, to discuss and suggest the appropriate preventive actions for vector borne diseases.
- **Monitoring of the implementation of vector control programmes across the country,** by the Ministry of Health (through an electronic questionnaire).
- **Distribution and placement of Long Lasting Insecticide-treated Nets (LLINs):** According to WHO and ECDC guidance, NPHO/ HCDCP distributed (since 2013, in each transmission period) LLINs to immigrants, in the Municipality of Evrotas, Lakonia, under a special license from the Ministry of Rural Development and Agriculture. The distribution, placement and monitoring of the proper use of the nets is implemented by the PACD field team, which conducts the active case detection in the area.
- **Participation in the implementation of indoor residual spraying (IRS):** The Region of Peloponnese implements every summer indoor residual spraying (IRS) in migrant residences in the area of Evrotas. The PACD field team participates in the activity by indicating migrant residences in the area. NPHO continues to recommend this vector control method in this area.
- **Entomological surveillance:** The NPHO, in collaboration with the Department of Parasitology, Entomology and Tropical Diseases of the School of Public Health-University of West Attica, the Benaki Phytopathological Institute, the MALWEST project (2012-2014), Universities, Regions, local authorities and subcontractors of the local mosquito control programmes has implemented, participated or coordinated active vector surveillance programme from 2010 to 2015. For the 2019 period, NPHO performs an active vector surveillance programme (September-November) in various areas of the country. NPHO recommends that local authorities should perform vector surveillance annually, especially in areas with risk factors for local malaria transmission (e.g. rural

areas with large populations of immigrants from malaria endemic countries) and tries to collect the available vector surveillance data.

IX. Communication with international public health stakeholders: The NPHO communicates frequently for exchange of knowhow and information on malaria cases and activities with the ECDC and WHO, as well as with a number of European and international agencies and networks.

In addition, due to the increased **immigrant/ refugee population residing in the country** in reception and accommodation camps, a series of targeted activities have been organized in these camps, including: strengthening malaria surveillance and diagnosis, distribution of rapid diagnostic tests to the camp clinics and nearby Health Units, recommendation for systematic vector surveillance in the area, risk assessment (collection of available vector, environmental and demographic data) and, if necessary, intensification of mosquito control measures, personal protection measures against mosquitoes and communication activities (leaflets distribution) for the hosted immigrants/ refugees.

Conclusions

As indicated by the malaria surveillance data, the risk of re-appearance of the disease in specific vulnerable and receptive areas of the country exists, especially where the presence of adequate numbers of *Anopheles* mosquitoes (the competent vector of the disease) is combined with the presence of malaria patients coming from endemic countries.

Following a peak of locally acquired malaria cases between 2011-2012, their number declined steadily in the following years. This decrease is the result of a number of intense and costly public health interventions implemented since 2011, with the collaboration of various stakeholders at the national, regional and local level, which have contributed to the successful prevention of the re-establishment of malaria in Greece.

However, sporadic introduced malaria cases or small clusters of introduced cases are still recorded over the last years in few vulnerable and receptive areas, indicating the need to sustain malaria prevention activities as a priority for the preparedness of public health authorities.

Early detection and eradication treatment of malaria cases, together with appropriate investigation and effective integrated vector control measures represent the main components of the public health strategy to prevent *P.vivax* reintroduction in high risk areas of the country. In this context, high level of preparedness and awareness of health and public health services should be maintained. In addition, important determinants for the prevention of local malaria transmission in Greece include the immigrants' health care and access to health services, for the timely diagnosis and treatment of malaria, the communication with the immigrant population and achieving a minimum standard for their living conditions and well-being.

Advice for travelers in Greece:

The NPHO, based on the surveillance data available until now and the implemented prevention measures in the areas where introduced *P.vivax* malaria cases have been reported, maintains that **the risk to travelers for malaria infection in Greece is very low. Chemoprophylaxis for malaria is not recommended for visitors** to areas where locally acquired/ introduced malaria cases have occurred until today. [Personal protective measures against mosquitoes](#) are encouraged during the mosquito circulation season.