HELLENIC CENTER FOR DISEASE CONTROL & PREVENTION
MINISTRY OF HEALTH

Protect yourself from mosquitoes

Annual epidemiological report for West Nile virus human infection, Greece, 2017

This report aims to present an overview of the reported cases and public health response to West Nile Virus (WNV) infection in humans in Greece for transmission period 2017.

Data presented in this report was derived from the notifications of laboratory diagnosed human cases of WNV infection sent to the Hellenic Center for Disease Control and Prevention (HCDCP-KEELPNO) by the treating physicians and from the daily communication with diagnostic laboratories: i) the National Reference Laboratory for Arboviruses, Aristotelian University of Thessaloniki, ii) the Department of Microbiology, School of Medicine, University of Athens, iii) the Hellenic Pasteur Institute. The Department of Epidemiological Surveillance and Intervention of the HCDCP undertook a verification procedure through communication with the treating physicians and the patients, as necessary.

In 2017, a total of forty-eight (48) laboratory diagnosed cases of WNV infection were reported to HCDCP, twenty-eight (28) of which presented with neuro-invasive disease (WNND, encephalitis and/or meningitis and/or acute flaccid paralysis) and 20 cases with mild symptoms (febrile syndrome) (Table 1). Among the WNND cases, five deaths were reported in patients >70 years old.

Table 1. Number of reported cases of WNV disease, Greece, 2017

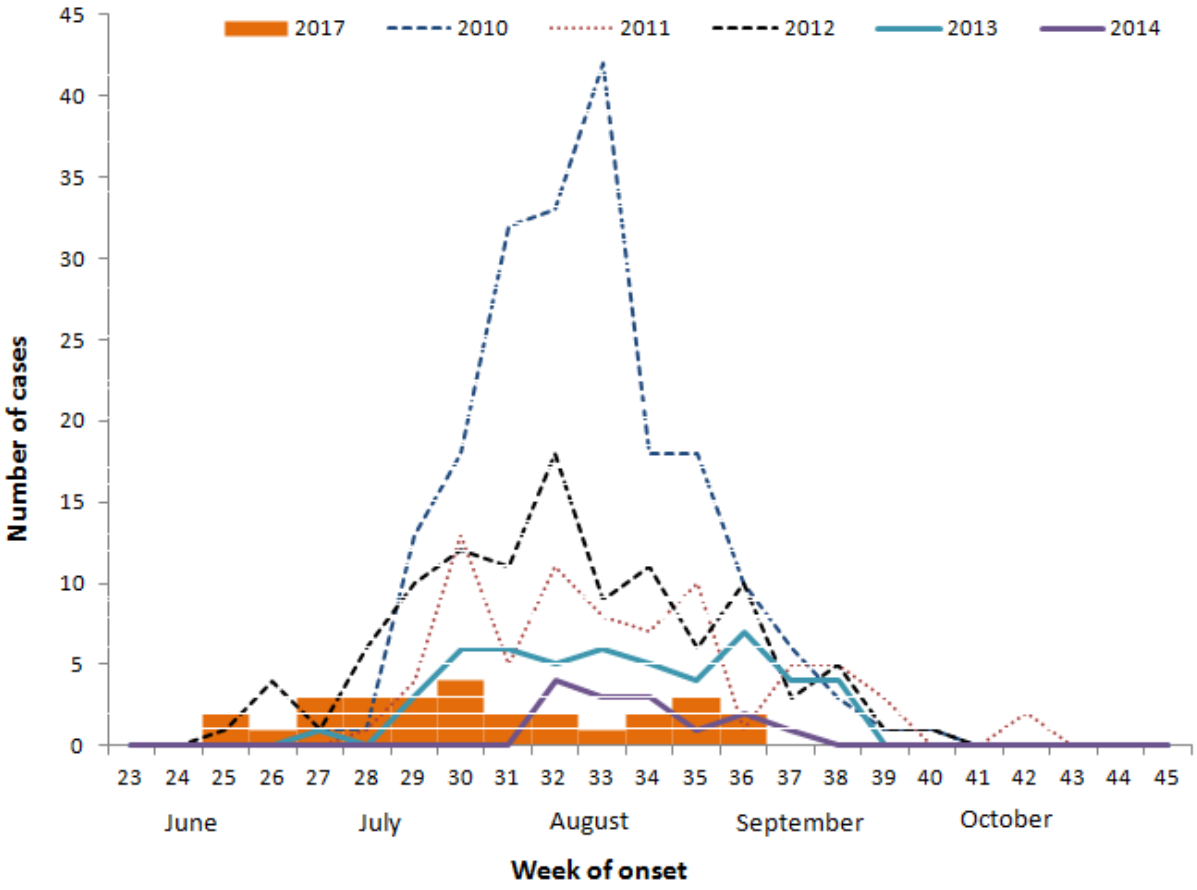
	Number of cases **with** central nervous system (CNS) manifestations [1]	Number of cases **without** CNS manifestations	**Total number of cases**	**Number of deaths** [2]
Number of WNV cases and deaths	28	20	**48**	**5**

1. Refers mainly to encephalitis, aseptic meningitis and meningoencephalitis cases
2. The number of deaths is included in the total number of cases

Five out of 48 patients diagnosed with WNV infection in 2017 were hospitalized in an Intensive Care Unit.

Figure 1 shows the reported WNND cases by week of symptom onset. The first diagnosed case of WNV infection for transmission period 2017 reported onset of symptoms on 20th June 2017 (wk 25/2017) and the last on 07th September 2017 (wk 36/2017).

Figure 1. Number of laboratory diagnosed WNND cases by week of symptom onset, Greece, 2017*



* Each orange box represents one laboratory diagnosed case of WNND reported to HCDCP in transmission period 2017.

Table 2 and Figure 2 show the geographic distribution of the notified human cases with laboratory diagnosed WNV disease at the level of estimated Municipalities of exposure. The patient's estimated place of exposure is a rough indicator of the area of WNV circulation.

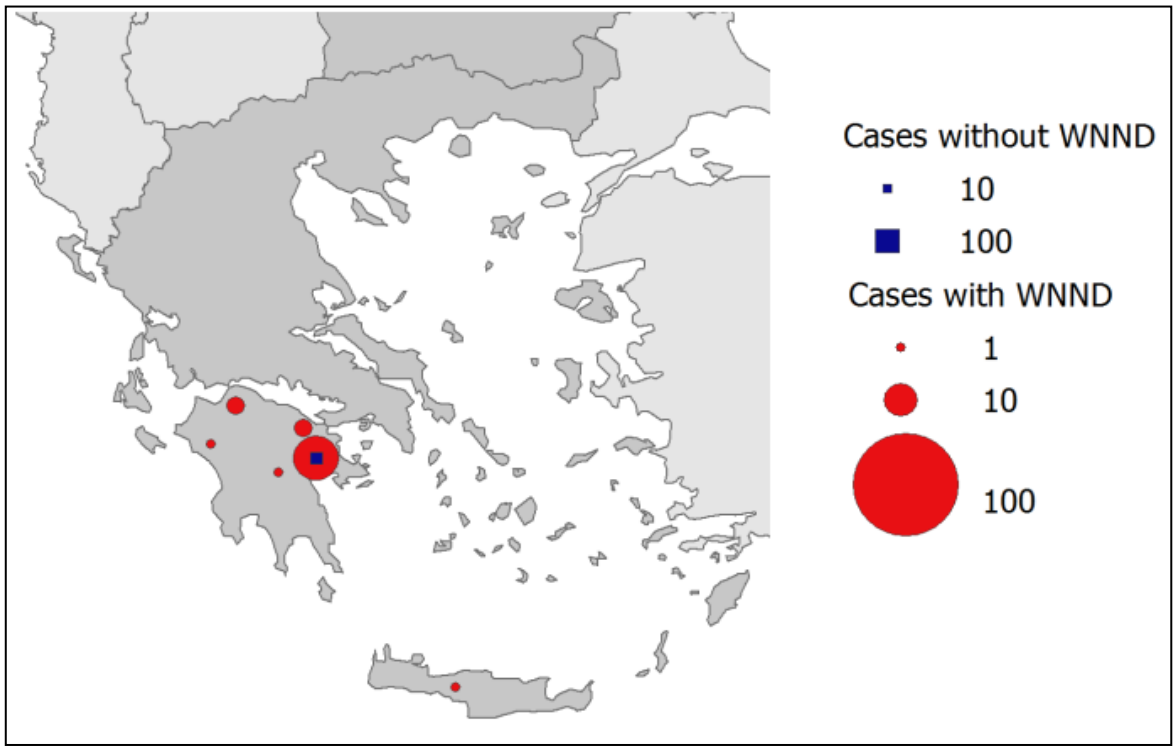
According to a serosurvey conducted in 2010 by the HCDCP and the National School of Public Health, at the epicentre of the 2010 WNV outbreak in Central Macedonia, it was estimated that WNND disease develops in 1:140 infected persons.

Table 2. Reported cases with laboratory diagnosed WNV disease (with and without WNND) by estimated Municipality of exposure, Greece, transmission period 2017 (n=48)

Regional Unit	Estimated Municipality of exposure	Number of cases with WNND	Incidence of WNND per 100,000 population*	Number of cases without WNND
Argolis	Argos-Mykines	13	30.94	12
	Nafplio	6	17.99	7
	Epidavros (Epidaurus)	0	0.00	1
Arcadia	North Kynouria	1	9.67	0
Ahaia	Patra	3	1.40	0
Ileia	Andravida- Kyllini	1	4.63	0
Corinth	Xylokastro - Evrostini	1	5.76	0
	Velo - Vocha	1	5.26	0
	Corinth	1	1.72	0
Rethimno	Agios Vasileios	1	13.46	0
Total Greece		28	0.26	20

*Calculations based on 2011 census data (Hellenic Statistical Authority).

Figure 2: Map showing the estimated place of exposure of reported cases with laboratory diagnosed WNV infection, Greece, 2017 (n=48)*.



*The size of the red cycles is proportional to the number of WNND cases and the size of the blue square is proportional to the number of cases without without WNND.

In 2017, human WNV cases were recorded both in areas with previously recorded human cases, such as the Regional Units (RU) of Ahaia and Ileia (in Western Greece Region), and in new areas where no human cases were previously recorded, such as the RU of Argolis, Arcadia, Corinth (in Peloponnese Region), and the RU of Rethimno (in Crete Region). The highest incidence of the WNV disease in humans was recorded in areas of the RU of Argolis.

The median age of WNND cases was 63 years (range: 15 - 91), while median age of the five lethal cases was 84 years (range: 74 - 91).

Out of the 28 WNND cases, 19 (68%) were male and 9 (32%) were female. Tables 3 and 4 show the number and incidence of WNND cases per age-group and gender respectively.

Table 3. Number and incidence of WNND cases per age-group, Greece, 2017 (n=28)

Age-group (years)	Number of cases	Incidence (per 100,000 population)*
0-39	5	0.10
40-59	4	0.13
60-69	7	0.62
70-79	6	0.59
≥80	6	1.03

*Calculations based on 2011 census data (Hellenic Statistical Authority).

Table 4. Number and incidence of WNND cases per gender, Greece, 2017 (n=28)

Gender	Number of cases	Incidence (per 100,000 population)*
Male	19	0.36
Female	9	0.16

*Calculations based on 2011 census data (Hellenic Statistical Authority).

Among the 28 WNND cases, 22 (79%) exhibited symptoms of encephalitis or meningoencephalitis and six (21%) cases exhibited symptoms of meningitis.

PUBLIC HEALTH MEASURES SUPPORTED BY THE HCDCP - 2017

The following public health measures have been implemented by the HCDCP and other involved stakeholders:

I. **Enhanced surveillance for encephalitis and other suspected cases of WNV disease in humans – Communication with health professionals and stakeholders**:

- **Awareness raising of physicians** about the WNV infection: Testing for West Nile virus infection in suspected cases (such as cases with encephalitis, aseptic meningitis, acute flaccid paralysis, fever of undetermined etiology) is recommended. The HCDCP provided guidelines for the recognition and diagnosis of WNV disease and the recommended laboratory investigation (mailings and website www.keelpno.gr), and urgently informed the local Health Units when WNV circulation was recorded in an area, through any surveillance system (human, animal, vector).
- **Daily communication and information exchange with laboratories** conducting diagnostic testing for WNV (active laboratory-based surveillance).
- **Enhancing laboratory diagnosis** of WNV infection and testing of suspected cases, by supporting the National Reference Laboratory.
- **Case investigation:** The Office for Vector-borne Diseases of HCDCP, Department of Epidemiological Surveillance and Intervention of HCDCP undertakes the **investigation** of every reported WNV infection case **within 24 hours after diagnosis**, in order to determine the estimated place of exposure, the risk factors and the severity of the disease.
- **Immediate update of stakeholders** on the diagnosed cases (Ministry of Health, Ministry of Rural Development and Food, Regions/ Directorate of Public Health, National Centre for Blood Donations, Municipalities).
- **Weekly surveillance report on human WNV infection cases** (uploaded on the HCDCP website).

II. **Communication and health promotion activities for the public:** Distribution of leaflets with educational material for the public regarding the recommended protective measures against mosquito bites in collaboration with local authorities; educational material in the HCDCP website. In 2017, information material (leaflets, posters) was created and distributed to the Regional authorities, according to their needs (upon request). In addition, HCDCP sent leaflets and posters in areas where cases were recorded (upon request).

III. Coordination of an intersectional Working Group (WG) on the definition of affected areas by vector borne diseases. This WG, under the MoH Committee for the Prevention and Management of Tropical Diseases, considered all available entomological and epidemiological data and decided on the characterization of affected areas where blood safety measures were implemented. The list of affected areas was published on our website (www.keelpno.gr) and updated regularly. These were used by the National Centre for Blood Donation (www.ekea.gr) to issue guidance on blood safety. In addition, the Coordinating Haemovigilance Centre of HCDCP issued guidance for the haemovigilance competent authorities.

The WG considered all available data and decided that there was no evidence of WNV circulation in Greece after 20.11.2017, for the 2017 transmission period.

IV. Collaboration and exchange of information with the **Ministry of Rural Development and Food** regarding the West Nile virus infection in equids.

V. Vector surveillance and control activities:

- **Raising awareness and guidance to Regional Authorities:** HCDCP communicates regularly (workshops, meetings, letters) with all Regional Authorities in Greece recommending the timely planning, organization and implementation of integrated vector control programmes. In 2017, HCDCP sent relevant awareness letters in January 2017 (with a brief guide to the key steps to achieve timely implementation of the vector control program) and further sent awareness letters (with the recommended prevention and response measures) in the local authorities of the recently affected areas. In addition, at the initiative of the Secretary General of Public Health of the Ministry of Health and the Association of the Regions of Greece, national and regional public health services held working group meetings regarding the preventive actions for the mosquito-borne diseases.
- **Monitoring of the vector control programmes' stage** at each Region/ Regional Unit.
- **Entomological surveillance**: The HCDCP, in collaboration with the Department of Parasitology, Entomology and Tropical Diseases of the National School of Public Health (NSPH), the Benaki Phytopathological Institute, the MALWEST project (2012-2014), Universities, Regions, local authorities and subcontractors of the local mosquito control programmes implemented, participated or coordinated -from 2010 to 2015- active vector surveillance programme. In 2017, HCDCP supported NSPH to test mosquitoes sent from the Regions for WNV and recommended to local authorities to perform vector surveillance, especially in the affected areas.
- **Communication with international public health stakeholders:** Frequent communication and weekly information exchange with ECDC (real-time reporting of the diagnosed cases in TESSy).

CONCLUSIONS

In 2010-2014, cases of West Nile virus infection were recorded in humans in various regions of Greece, while virus circulation was recorded in almost all regions. In 2015 and 2016 transmission seasons no cases of WNV infection was recorded in humans in Greece; however, given the complex epidemiology of the virus the recurrence of WNV infection cases in humans in the country was considered likely.

In 2017, human WNV cases were recorded both in areas with previously recorded human cases, such as the Regional Units (RU) of Ahaia and Ileia (in Western Greece Region), and in new areas where no human cases were previously recorded, such as the RU of Argolis, Arcadia, Corinth (in Peloponnese Region), and the RU of Rethimno (in Crete Region). The recording of human cases in 2010-2014 and 2017 suggests that WNV has been established in our country; its circulation and occurrence of cases remain likely in the following transmission periods, in previously affected and in new areas.

In transmission period 2017, in the European Union and neighboring countries, WNV cases were reported besides Greece, from Israel, Italy, Serbia, Romania, Austria, Hungary, Croatia, Bulgaria, Turkey and France (source: ECDC).

Epidemiological surveillance of the disease, systematic and early implementation of mosquito control programs and personal protective measures against mosquito bites are considered the most appropriate measures to control WNV infection outbreaks.

Since the areas of virus circulation in the future cannot be predicted, personal protective measures against mosquitoes are strongly encouraged all over Greece, during the whole period of mosquito activity.