



HELLENIC CENTER FOR  
DISEASE CONTROL & PREVENTION

MINISTRY OF HEALTH

## ANNUAL EPIDEMIOLOGICAL REPORT WEST NILE VIRUS INFECTION, GREECE, 2012

This report aims to present an overview of the epidemiological characteristics of the reported cases of West Nile Virus (WNV) infection in Greece for the transmission period 2012.

Data presented in this report are derived from the notifications of laboratory confirmed and probable cases sent to the Hellenic Centre for Disease Control and Prevention (HCDCP-KEELPNO) by their treating physicians. Laboratory data are also included from: i) the Reference Laboratory for Arboviruses, Aristotelian University of Thessaloniki, ii) the Department of Microbiology, School of Medicine, University of Athens, iii) the Department of Microbiology, Infectious Disease Hospital of Thessaloniki and iv) the Department of Diagnostic Services, Hellenic Pasteur Institute. The Department of Epidemiological Surveillance and Intervention of the HCDCP undertakes a verification procedure through communication with the treating physicians and the patients, as necessary.

In 2012, 161 laboratory diagnosed cases of WNV infection have been reported to HCDCP including 18 deaths; 109 out of the 161 cases presented with neuro-invasive disease (encephalitis and/or meningitis and/or acute flaccid paralysis) and 52 cases with mild symptoms (febrile syndrome) ([Table 1](#)). One of the 109 cases West Nile Neuro-invasive Disease (WNND) cases was diagnosed in Germany (source: EWRS).

Two additional WNND cases were imported to Greece from the USA and are not included in the following analysis.

**Table 1. Number of cases with laboratory diagnosed WNV infection, Greece, 2012**

	Number of cases <b>with</b> central nervous system manifestations	Number of cases <b>without</b> central nervous system manifestations	<b>Total number of cases</b>	<b>Number of deaths</b> <sup>[1]</sup>
Cases diagnosed and deaths	109	52	<b>161</b>	18

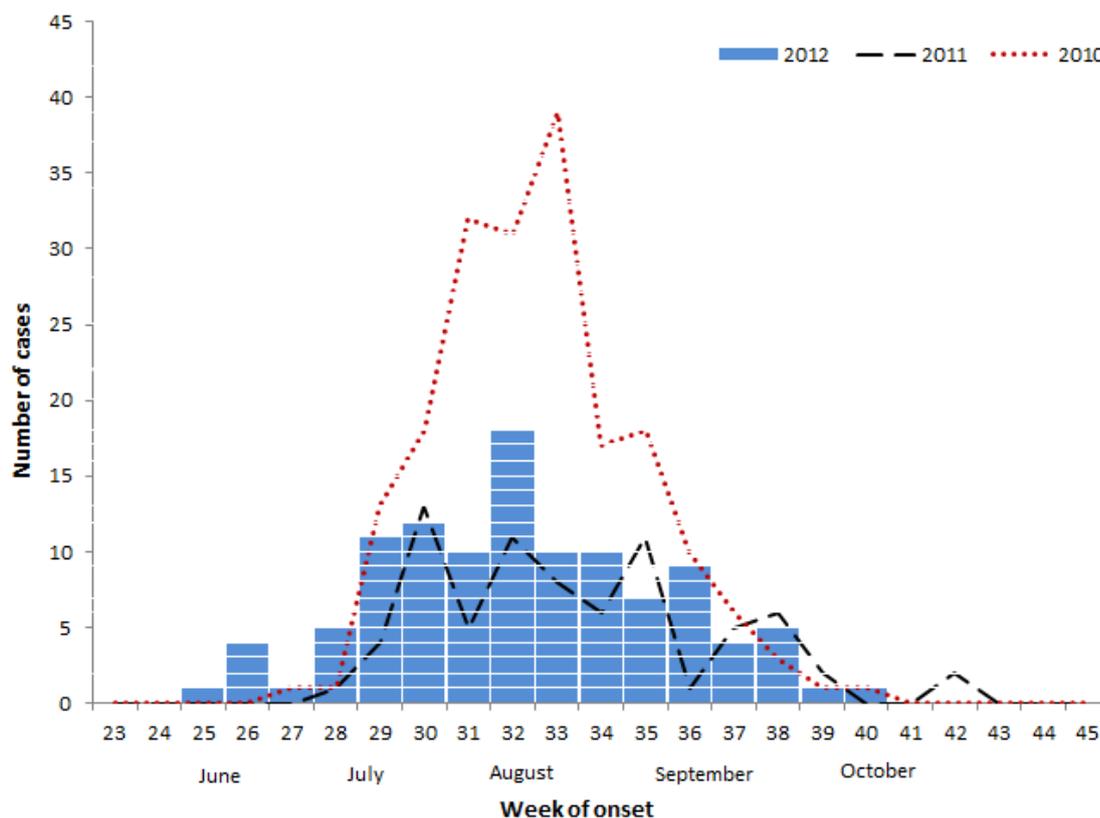
<sup>[1]</sup> The number of deaths is included in the total number of cases

The analysis that follows refers to the 109 WNND cases without reported travel history to another country during the incubation period.

According to a sero-epidemiological survey conducted in 2010 by the HCDCP in collaboration with the National School of Public Health in the epicenter of the outbreak of Central Macedonia, WNND disease develops in 1:140 infected persons.

[Figure 1](#) shows the reported WNND cases by week of symptoms onset. The first case for 2012 reported onset of symptoms in week 25/2011 (20/06/2012) and the last recorded case in week 40/2012 (07/10/2012).

**Figure 1. Number of laboratory diagnosed WNND cases by week of symptoms onset, Greece, 2012\***



\*The dotted red line represents the number of WNND cases reported in 2010, while the dotted black line represents the number of WNND cases reported in 2011. Each box represents one laboratory diagnosed case of WNND reported in period 2012.

[Table 2](#) and [Figure 2](#) show the geographic distribution of the notified WNND cases in Greece, at the level of suspected municipality of exposure, which is a crude indicator of WNV circulation. [Figure 3](#) shows the geographic distribution of the notified WNND cases in Attiki.

For two particular cases, the suspected place of exposure was undetermined due to uncertainty regarding the date of symptoms onset as well as a complicated travel history in the 15 days prior to that. In addition, one of the reported WNND cases acquired the infection through blood transfusion: an immunosuppressed patient, with a history of multiple transfusions. Both the blood collection and the blood transfusion took place before the diagnosis of the first case of WNV infection in Greece in 2012, which was the criterion for the start of the implementation of blood safety measures in affected areas. These three cases are not included in the [Figures 2 and 3](#).

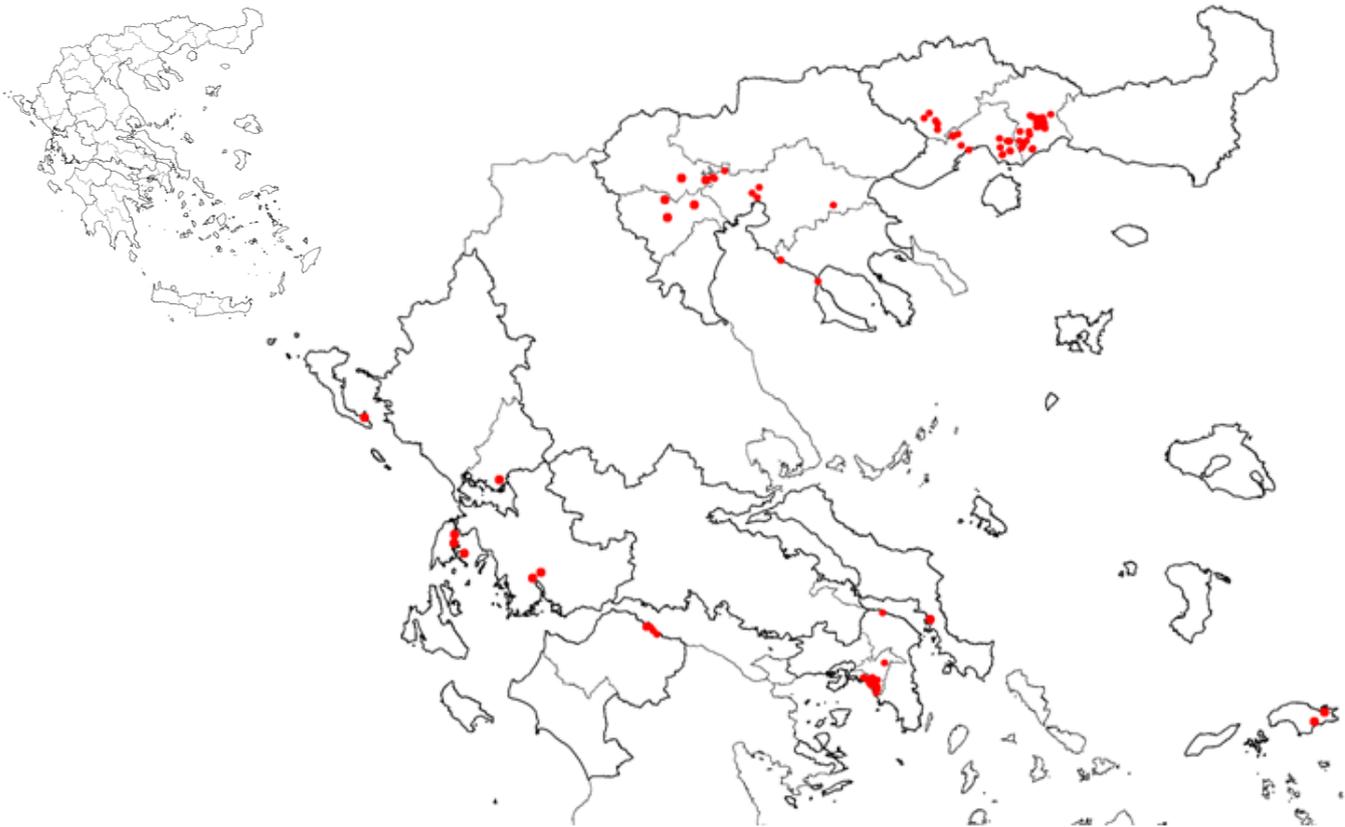
**Table 2. Suspected place of exposure of patients with WNND, Greece, 2012**

<b>Municipality</b>	<b>Number of cases</b>	<b>Incidence per 100.000 population*</b>	<b>Regional Unit</b>
Topeiros	10	86,63	Xanthi
Avdira	11	57,88	Xanthi
Xanthi	2	3,07	Xanthi
Nestos	11	49,26	Kavala
Kavala	7	9,93	Kavala
Doxato	2	13,78	Drama
Drama	3	5,09	Drama
Palaio Faliro	11	17,18	South Section of Athens
Alimos	5	11,98	South Section of Athens
Elliniko - Argiroupoli	4	7,79	South Section of Athens
Glifada	2	2,29	South Section of Athens
Kallithea	2	1,99	South Section of Athens
Nea Smyrni	1	1,37	South Section of Athens
Marousi	1	1,38	North Section of Athens
Helioupolis	1	1,28	Central Section of Athens
2 <sup>nd</sup> Municipal Department (Municipality of Athens)	1		Central Section of Athens
Piraeus	1	0,61	Piraeus
Oropos	1	2,96	East Attiki
Aigialia	5	10,03	Ahaia
Nea Propontida	3	8,22	Halkidiki
Kimi-Aliveri	1	3,52	Evia
Samos	2	6,06	Samos
Meganisi	1	96,06	Lefkada

Lefkada	2	8,83	Lefkada
Heroic City of Naousa	1	3,08	Imathia
Alexandria	1	2,40	Imathia
Veria	1	1,50	Imathia
Halkidona	3	8,91	Thessaloniki
Volvi	1	4,26	Thessaloniki
Oraiokastro	1	2,61	Thessaloniki
Delta	1	2,18	Thessaloniki
Kordelio-Evosmos	1	0,98	Thessaloniki
Pella	2	3,17	Pella
Heroic City of Messologi	1	2,91	Aitoloakarnania
Agrinio	1	1,06	Aitoloakarnania
N. Skoufas	1	7,84	Arta
Corfu	1	0,98	Corfu
Undetermined possible place of exposure	2		
Infection through blood transfusion	1		
<b>Total Greece</b>	<b>109</b>	<b>1,01</b>	

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

**Figure 2: Map showing the suspected place of exposure of WNND cases, Greece, 2012 (n=106)<sup>1</sup>**



Source: HCDCP

**Figure 3: Map showing the suspected place of exposure of WNND cases, Attiki, 2012 (n=30)**



Source: HCDCP

<sup>1</sup>Each red dot represents one WNV neuro-invasive case.

As indicated from the aforementioned data, two main outbreak epicentres were identified: the urban southern suburbs of Athens with 28 (26%) WNND cases occurring mainly during July, and six weeks later a newly affected wetland area in the region of East Macedonia-Thrace with 46 (42%) WNND cases occurring during August – September 2012. The remaining WNV cases occurred mainly in Central Macedonia and Western Greece.

The age range of WNND cases in 2012 was between 11– 95 years (median age: 70 years) and 65% of all WNND cases were male.

[Tables 3 and 4](#) below show the number of WNND cases per age-group and gender and the age- and gender-specific incidence respectively.

**Table 3. Number of WNND cases per age-group and age-specific incidence, Greece, 2012**

Age-group	Number of cases	Incidence (per 100,000 population)*
<20	2	0,09
20-29	3	0,23
30-39	3	0,17
40-49	4	0,23
50-59	12	0,80
60-69	29	2,34
70-79	31	2,94
≥80	25	4,22

**Table 3. Number of WNND cases per gender and gender-specific incidence, Greece, 2012**

Gender	Number of cases	Incidence (per 100,000 population)*
Male	71	1,27
Female	38	0,67

\*Calculation based on the estimated population for 1st January 2012 (Hellenic Statistical Authority).

Encephalitis/meningoencephalitis (90; 83%) was the most prominent clinical syndrome among WNND cases, followed by meningitis alone (17; 15%). In addition, five (5%) patients with acute flaccid paralysis were reported, 2 (2%) without symptoms of encephalitis or meningitis.

As in the previous two transmission periods, during the transmission period 2012 WNV lineage 2 circulated in the country.

## CONCLUSIONS

After the first outbreak of WNV infection in humans in Greece in 2010 (mainly in Central Macedonia) and the further detection of cases in 2011, it was expected that WNV will circulate again in 2012.

Cases of WNV infection have been reported in 2012 from areas of Attiki (in particular from the south suburbs of Athens), Thessaloniki, Halkidiki, Pella, Imathia, Kavala, Aitolokarnania, and Evia, where cases had been recorded in previous years, as well as from and the areas of Xanthi, Drama, Ahaia, Arta and the islands of Samos, Lefkada and Corfu, which represent new areas of WNV circulation in Greece.

During the 2012 transmission period, WNV cases were also reported in Europe from Italy, the Russian Federation, Israel, F.Y.R.O.M., the Occupied Palestinian territory, Tunisia, Serbia, Romania, Croatia, Kosovo, Algeria, Montenegro, Ukraine and Hungary (source: ECDC).

Epidemiological surveillance, systematic and early mosquito control and personal protective measures against mosquito bites are the most appropriate measures for the control of the disease.

## PUBLIC HEALTH MEASURES SUPPORTED BY THE HCDCP - 2012

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

1. Enhanced surveillance for encephalitis and WNV infections in humans, which is in place since 2010.
2. Awareness raising among clinicians by providing guidelines for the recognition, diagnosis and management of WNV infection. The HCDCP website provided updated information for health professionals (case definition, instructions for samples, laboratory diagnosis, management) [www.keelpno.gr](http://www.keelpno.gr).
3. Communication and health promotion activities in schools and healthcare facilities all over the country and educational material for the public provided from the HCDCP website.
4. Blood safety measures were implemented by the National Centre for Blood Donations according to EU guidelines. A multisector Working Group for the Designation of Affected areas by Vectorborne diseases met regularly during the 2012 transmission period to review available data and provide guidance. Targeted NAT and minipool testing of blood donations from affected areas was performed in 2012. According to this WG and after review of the available epidemiological data from all the operating systems (mosquitoes, wild birds, chicks, equids, human cases and blood donations) the transmission period for 2012 ended on 10/11/2012.
5. Collaboration and exchange of information with the Veterinary Public Health (VPH) services of the Ministry of Agriculture, especially regarding WNV in equidae.
6. HCDCP is collaborating with the University of Thessaly for the project: "Control of West Nile Virus and Malaria - Strengthening of Surveillance in the Greek territory", funded by the NSRF (2007-2013) [www.malwest.gr](http://www.malwest.gr). The various work packages include the development of geographical information systems (GIS), the strengthening of epidemiological surveillance for both diseases, the mapping of mosquito habitats and mosquito sampling from high-risk areas, the strengthening of wild bird and equidae monitoring for WNV transmission, informative campaigns addressing the public, especially high-risk groups, and health professionals who are involved directly with the control and treatment of both diseases.

- The Veterinary School, Aristotelian University of Thessaloniki undertook a sero-epidemiological surveillance of household poultry (<6 months old) in north Greece.
  - The Veterinary School, University of Thessaly undertook surveillance of wild birds in various areas in Greece, including Attiki.
7. Entomology surveillance continued all over Greece for the second consecutive year, financed by KEELPNO, which awarded three tenders for three large geographical areas: Central Greece and Attiki, North Greece (West-Central and East Macedonia and Thrace), West Greece and Peloponnese. The surveillance and testing of mosquitoes was carried out by the Department of Parasitology - National School of Public Health, the Department of Microbiology, Medical School, University of Athens and the Veterinary School, University of Thessaly.
- The projects operated from May - October 2012. On average 20-60 traps were placed in each geographic region.
  - All traps captured adult mosquitoes, and the most frequent species identified was *Culex spp.* followed by *Aedes spp.* and *Anopheles spp.*
  - Highest numbers of *Culex spp* mosquitoes were noted in July (10-20/07) and from 20/08-10/09/2012
  - Results of mosquito testing for WNV confirm the presence of the virus in mosquitoes from the majority of the areas under surveillance.
8. Continuing collaboration and communication with the ECDC, the European Commission and international partners.