



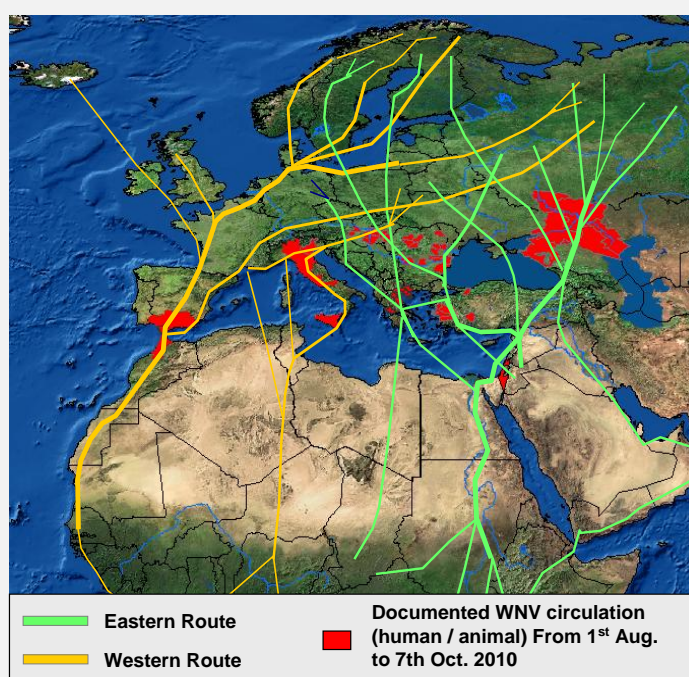
# WEST NILE VIRUS CIRCULATION IN THE EPISOUTH COUNTRIES AND NEIGHBOURING AREAS SEASONS 2010, 2011 AND 2012 *Update 20<sup>th</sup> June 2013*

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## KEY POINTS

- ❖ Following the unprecedented West Nile Virus (WNV) outbreak in 2010 in the Mediterranean region, the close monitoring of the 2011 & 2012 following seasons was crucial to better appraise WNV circulation in the area.
- ❖ The 2011 and 2012 seasons confirmed the unusual WNV dynamic in the Mediterranean basin observed in 2010.
- ❖ In 2010, 485 human cases were reported in 9 EpiSouth countries, 54% of these cases occurred in Greece.
- ❖ In 2011, 231 human cases were reported in 8 EpiSouth countries, with 43% of them in Greece.
- ❖ In 2012, 514 human cases were reported in 15 countries EpiSouth, with 31% in Greece.
- ❖ Throughout the years, a geographical extension was reported within previously affected countries and to new countries.
- ❖ During all seasons, viral circulation was more intense in the Eastern part of the Mediterranean region. Nonetheless in 2012 WNV circulation was more intense in Tunisia compared to the previous years and Algeria reported its first WNV human case since the 90s.
- ❖ Lineage 2 was isolated in 5 countries located in Southern Europe and Balkans (Greece, Italy, Romania, Albania and Serbia), and 1 country of the eastern Mediterranean (Israel) while lineage 1 was detected in Southern Europe (Italy and Spain) and the eastern Mediterranean (Israel and Turkey).
- ❖ During those three years, outbreaks were identified on all major birds' migratory routes crossing the Mediterranean region.
- ❖ Sustained transmission cannot be excluded in the coming year.
- ❖ Genetic information is too scarce to allow detailed description of the dynamic.

**MAP 1. MIGRATORY ROUTES IN THE MEDITERRANEAN REGION**  
(SOURCE: EPISOUTH)



## BACKGROUND

- West Nile Virus (WNV) is a flavivirus belonging to the Japanese encephalitis antigenic complex. It has been discovered in 1937 in Uganda, and its circulation has been documented in Africa, the Americas, Asia, Europe and the Middle East.
- WN is a mosquito-borne infection affecting mainly wild birds and transmitted by different mosquitoes' species mainly *Culex spp* and *Aedes spp*. Human and mammals, especially horses, are occasional hosts and play limited roles in the natural cycle.
- Several WNV subtypes have been described. Previous European and Mediterranean basin outbreaks were due to lineage 1 strains whereas lineage 2 strains circulating mainly in Sub-Saharan Africa and Madagascar were considered non-pathogenic in human and horses. Recent publications from South Africa and Russia suggest that lineage 2 strains could be more pathogenic for human and horses than initially considered.
- Humans are mainly infected through the bite of an infected mosquito but transmission through blood transfusion or organ transplants also occurs.
- The incubation period is usually 3 to 14 days. Around 80% of human infections are asymptomatic. The 20% symptomatic cases present a usually self-limited fever syndrome and less than 1% of WNV infections develops a severe form potentially lethal (i.e. meningitis, encephalitis or paralysis). Treatment is mainly symptomatic and no vaccine is available for humans (only for horses).
- Among severe cases, case fatality rate (CFR) ranges from 3 to 15 % and is higher in elderly.
- Since the first documented outbreak in 1951 in Israel, outbreaks or sporadic WNV circulation has been documented in countries of the Balkans, Middle-East, North-Africa and Southern Europe. Large outbreaks affecting several hundred cases were described in Romania in 1996-1997, in Tunisia in 1997, in Southern Russia in 1999 (mainly in Volgograd, Astrakhan and Krasnodar regions) and in Israel in 2000. Up to 2010, these events remained restricted to limited geographical settings.
- In 2010, unprecedented WN viral circulation occurred in the Mediterranean region and WNV infections were reported in 9 EpiSouth countries (cf. note on [WNV in EpiSouth countries](#), in 2010).
- In 2011 and 2012, large WN outbreaks confirmed the WN viral circulation in the Mediterranean area.

## DATA COLLECTION

- Data regarding number of human and animal cases diagnosed in 2010, 2011 and 2012, and the nature of WNV surveillance and laboratory capacities were collected from the 27 EpiSouth countries.

- On 20<sup>th</sup> December 2012, questionnaires were sent to EpiSouth focal points. Focal points were asked to review the 2010 and 2011 information already provided, and to provide the 2012 data. Information was also consolidated with data provided by the WP4 on Laboratory networks. Official reports issued by OIE, MoH/MoA and ECDC were also considered for cases counts.
- All 27 EpiSouth countries provided information regarding their current epidemiological situation and/or their WNV Surveillance system in 2010, 2011 and/or 2012.
- This analysis aims at comparing 2010, 2011 and 2012 WNV seasons in terms of epidemiological situation (number of cases and geographic distribution) and surveillance systems. In this note, the number of reported cases corresponds to the suspect and confirmed cases, based on the national definitions (of suspect and confirmed cases).
- In the course of a known and ongoing epidemic not all cases have to be fully biologically confirmed especially those occurring in well identified endemic zones. Therefore in endemic countries biological confirmation procedures may change over time (e.g. only through serology and not through PCR or seroneutralisation). Therefore, within all cases, the proportion of biologically confirmed and suspect cases is subject to changes.

In this respect, both confirmed and suspect human cases were considered for the analysis when at least part of the cases was biologically confirmed. Conversely, for countries where only clinically suspect cases were detected, these suspect cases were not considered for the case count and the viral circulation among humans.

## SURVEILLANCE SYSTEMS

- 26 countries provided information on their **WN surveillance system** (cf. table 1). As of 12<sup>th</sup> March 2012, the situation in 2012 was as followed:
  - ✓ **22 countries have a human surveillance system:** 16 countries have a permanent surveillance system (new for Bulgaria in 2011 and for Malta and Montenegro in 2012), 3 have a seasonal surveillance system (in process since 2011 for Serbia) and 3 have a combination of both.
  - ✓ **14 countries have an equine surveillance system:** 8 countries maintain permanent equine surveillance system (new for Croatia in 2011), 4 have seasonal surveillance (new for Former Yugoslav Republic of Macedonia (FYROM) in 2011), and 2 have a combination of both.
  - ✓ Among the **11 countries having bird surveillance**, 4 maintain a permanent surveillance and 4 have a seasonal surveillance, while 3 countries have a combination of permanent and seasonal surveillance.

- ✓ 4 countries (Algeria, Bosnia-Herzegovina, Lebanon and Syria) have **neither human nor equine surveillance**. Syria and Lebanon never reported WN cases (cf. Table 1, Map 1).
- Following the unprecedented 2010 and 2011 outbreaks, changes have occurred in surveillance systems in the area. These changes need to be taken into account in the evolution of the WNV epidemic throughout the years.

## LABORATORY CAPACITIES

- ✓ Among the 25 countries for which information is available, 24 have a national reference laboratory among which 21 have the capacity to diagnose WNV cases (cf. Table 1, Map 2).
- ✓ 2 countries don't have specific reference laboratory.

## EPIDEMIOLOGICAL SITUATION

### Overview

- Of the 27 EpiSouth countries:
  - ✓ In **2010**, 11 countries reported WNV circulation in human and/or equine (cf. map 3).
  - ✓ In **2011**, 9 EpiSouth countries have reported WNV circulation in human and/or equine (cf. map 4).
  - ✓ In **2012**, 16 EpiSouth countries have reported WNV circulation in human and/or equine (cf. map 5).

### In humans:

According to data reported by EpiSouth countries:

- In **2010**, 485 human WN infections were reported in **9 countries**: Albania, Greece, Israel, Italy, Palestine, Romania, Spain, Tunisia & Turkey. For **Albania, Greece and Turkey**, these clinical WN human cases were the first ever reported in the countries.
- In **2011**, 231 human WN infections were reported in **8 countries**: Albania, Greece, Israel, Italy, FYROM, Romania, Tunisia & Turkey. For **FYROM** these cases were the first reported in the country. Note for Albania, a child affected in 2010 was retrospectively notified in 2011.
- In **2012**, 514 human WN infections were reported in **15 countries**: Algeria, Bosnia-Herzegovina, Bulgaria, Croatia, Greece, Israel, Italy, Kosovo, FYROM, Montenegro, Palestine, Romania, Serbia, Tunisia & Turkey. For **Bosnia- Herzegovina, Bulgaria, Croatia, Kosovo, Montenegro and Serbia** these WN human cases were the first ever reported in the countries. In **Algeria**, in 2012, it has been the first time WN human case was reported in the country since its last outbreak in the 90s.

- There were approximately 50% less WN human infections in 2011 compared to 2010 but there were two times more cases in 2012 compared to 2011. In 2012, there was an increase of WN human infections by 5% compared to 2010.
- Albania and Spain did not report any WNV human infection in 2012. Albania reported human cases in 2010 and 2011 and Spain reported human cases in 2010 and equine cases in 2010, 2011 and 2012.

### In equine:

- In **2010**, 8 countries reported equine WN cases: Bulgaria, Greece, Israel, Italy, Morocco, Romania, Spain and Turkey.
- In **2011**, only 6 countries reported equine WN cases: Greece, Israel, Italy, FYROM, Serbia and Spain.
- In **2012**, only 5 countries reported equine WN cases: Croatia, Greece, Israel, Italy and Spain.
- 4 countries reported equine cases during the 3 consecutive years: in 2010, 2011 and 2012.  
In 2010, Morocco and Bulgaria reported equine cases only (no human cases), same for Serbia and Spain in 2011 and Spain in 2012.

### Seasonality

- Among the 8 EpiSouth countries providing information on date of onset of symptoms of first and/or last case of WNV in humans, for the year 2012, the earliest case occurred on 3<sup>rd</sup> January in Israel, and the latest case occurred on 21<sup>st</sup> December in Tunisia.
- For most of other countries, in 2012, onset of symptoms were reported from May to October.

### Lineage

- Understanding the genetic relations between the viruses circulating across the area would be essential to better understand the dynamic of the viral circulation in the Mediterranean area. Unfortunately, lineage and molecular analysis are delicate techniques requiring genetic sequencing that are not widely available.
- Therefore genetic information allowing describing viral circulation in 2010-2012 is very scarce. Based on data available in countries strains both lineage 1 and lineage 2 have been identified :

- ✓ **Lineage 2** strain was isolated in:
- Italy, from mosquitoes<sup>1</sup> and humans in 2011<sup>2</sup> and 2012
  - Israel in 2010, 2011, 2012
  - Greece, from a human<sup>3</sup> & mosquitoes<sup>4,5,6,7,8,9</sup> in 2010, 2011 and 2012.
  - Romania, from human both in 2010 & 2011
  - Albania, in human in 2011.
  - Serbia, from mosquitoes, in 2012.

Strains for which information was available were either related to the 2007 Volgograd strain or the Hungarian strain isolated from birds in 2004<sup>10</sup>.

- ✓ **Lineage 1** strain was isolated in:
- Italy, from humans in 2010 2011 and 2012
  - Israel in 2010, 2011, 2012
  - Spain, from 2 human cases in 2010.
  - Turkey in 2012.

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<sup>1</sup> Savini G, Capelli G, Monaco F, Polci A, Russo F, et al. [Evidence of West Nile virus lineage 2 circulation in Northern Italy](#). Vet Microbiol. 2012.

<sup>2</sup> C Rizzo, P Salcuni, L Nicoletti, M G Ciufolini et al. [Epidemiological surveillance of West Nile neuroinvasive diseases in Italy, 2008 to 2011](#), Eurosurveillance, Volume 17, Issue 20, 17 May 2012.

<sup>3</sup> Papa A, Politis C, Tsoukala A, Eglezou A, Bakaloudi V, Hatzitaki M, et al. [West Nile virus lineage 2 from blood donor, Greece](#) [letter]. Emerg Infect Dis]. 2012 Apr 24.

<sup>4</sup> Papa A, Xanthopoulou K, Gewehr S, Mourelatos S. Detection of West Nile virus lineage 2 in mosquitoes during a human outbreak in Greece. Clin Microbiol Infect. 2011;17(8):1176-80.

<sup>5</sup> Papa A, Bakonyi T, Xanthopoulou K, Vasquez A, Tenorio A, Nowotny N. Genetic characterization of a lineage 2 West Nile virus, Greece, 2010. Emerg Infect Dis 2011;17:920-2.

<sup>6</sup> Danis K, Papa A, Papanikolaou E et al. Ongoing outbreak of West Nile virus infection in humans, Greece, July to August 2011. Eurosurveillance 2011;16(34).

<sup>7</sup> Papa A, Xanthopoulou K, Tsioka A, Kalaitzopoulou S, Mourelatos S. West Nile virus in mosquitoes in Greece. Parasitol Res. 2013 Apr;112(4):1551-5. doi: 10.1007/s00436-013-3302-x. Epub 2013 Jan 31.

<sup>8</sup> Papa A, Papadopoulou E, Gavana E, Kalaitzopoulou S, Mourelatos S. Detection of West Nile Virus Lineage 2 in Culex Mosquitoes, Greece, 2012. Vector Borne Zoonotic Dis. 2013 May 22. [Epub ahead of print]

<sup>9</sup> Valiakos G, Touloudi A, Iacovakis C, Athanasiou L, Birtsas P, Spyrou V, et al. [Molecular detection and phylogenetic analysis of West Nile virus lineage 2 in sedentary wild birds \(Eurasian magpie\), Greece, 2010](#). Euro Surveill. 2011;16(18):pii=19862.

<sup>10</sup> Papa A, Politis C, Tsoukala A, Eglezou A, Bakaloudi V, Hatzitaki M, et al. [West Nile virus lineage 2 from blood donor, Greece](#) [letter]. Emerg Infect Dis]. 2012 Apr 24.



**TABLE 1. WNV SURVEILLANCE IN HUMAN AND EQUINE, IN EPI SOUTH COUNTRIES, 2012**

	Countries	WNV surveillance		National Reference laboratory	WN virus diagnostic available
		In Human	In Equine		
1	Albania	Permanent	No	Yes	Yes
2	Algeria	No	No	Yes	-
3	Bosnia-Herzegovina	No	No	Yes	No
4	Bulgaria	permanent (2011 )	Permanent	Yes	Yes
5	Croatia	Permanent	Permanent (2011)	Yes	Yes
6	Cyprus	Permanent	Permanent	Yes	Yes
7	Egypt	-	-	-	-
8	France	Permanent + seasonally enhanced	Permanent+ seasonal	Yes	Yes
9	Greece	Permanent	Permanent	Yes	Yes
10	Israel	Permanent	Permanent	Yes	Yes
11	Italy	Seasonal	Seasonal	Yes	Yes
12	Jordan	Permanent	Seasonal	Yes	Yes
13	Kosovo	Permanent	No	Yes	Yes
14	Lebanon	no	no	-	-
15	Libya	Permanent	No	Yes	Yes
16	FYROM	Permanent	Seasonal (2011)	Yes	yes
17	Malta	Permanent (2012)	No	Yes	Yes
18	Montenegro	Permanent (2012)	No	Yes	No
19	Morocco	Permanent	Permanent	Yes	Yes
20	Palestine	Permanent + seasonally enhanced	Seasonal	Yes	Yes
21	Romania	Seasonal	Permanent + seasonal	Yes	Yes
22	Serbia	Seasonal (in process since 2011)	no	Yes	Yes
23	Slovenia	Permanent	no	Yes	Yes
24	Spain	Permanent (spec. areas)	Permanent (spec. areas)	Yes	Yes
25	Syria	No	No	No	No
26	Tunisia	Permanent + seasonally enhanced	no	Yes	Yes
27	Turkey	permanent	Permanent	Yes	Yes

- no information

**TABLE 2. NUMBER OF HUMAN AND EQUINE CASES BY COUNTRIES, 2010 - 2012**

	Countries	N confirmed and suspect/ probable autochthonous human cases (death)			N confirmed and suspect/probable equine cases		
		2010	2011	2012	2010	2011	2012
1	Albania	1	49	0	0	0	0
2	Algeria	0	0	1	0	0	0
3	Bosnia-Herzegovina	0	0	1	0	0	0
4	Bulgaria	0	0	2	8	0	0
5	Croatia	0	0	6	0	0	12
6	Cyprus	0	0	0	0	0	0
7	Egypt	0	0	-	0	0	0
8	France	0	0	0	0	0	0
9	Greece	262 (35)	100 (9)	161 (18)	30	24	16
10	Israel	109 (4)	45 (3)	101 (3)	8	11	34
11	Italy	3 (0)	14 (7)	28 (1)	128	197	65
12	Jordan	0	0	0	0	0	0
13	Kosovo	0	0	6	0	0	0
14	Lebanon	0	0	0	0	0	0
15	Libya	0	0	0	0	0	0
16	FYROM	0	4	6	0	10	0
17	Malta	0	0	0	0	0	0
18	Montenegro	0	0	1	0	0	0
19	Morocco	0	0	0	24	0	0
20	Palestine	1	0	2	0	0	0
21	Romania	57 (5)	11(1)	15 (1)	6	0	0
22	Serbia	0	0	71 (9)	0	42	0
23	Slovenia	0	0	0	0	0	0
24	Spain	2 (0)	0	0	39	11	4
25	Syria	0	0	0	0	0	0
26	Tunisia	3 (0)	3 (0)	86 (12)	0	0	0
27	Turkey	47 (10)	5 (3)	13 (0)	2	0	0
	<b>TOTAL</b>	<b>485 (38)</b>	<b>231 (17)</b>	<b>514 (44)</b>	<b>245</b>	<b>253</b>	<b>131</b>

## Countries Data

### South Europe

#### Bulgaria:

##### • WNV Surveillance

- Since July 2011, a system of surveillance of WNV infection in human has been implemented. So far only infections in birds and equines were under surveillance.

##### • Human cases

- No biologically confirmed WNV human infections were reported in 2010 and in 2011.
- In 2011 one possible human case was reported but it could not be laboratory confirmed (seroneutralisation is not available in Bulgaria).
- In 2012, 2 confirmed (ELISA, IgM) human cases were reported in Burgas (East of the country).

##### • Equine cases

- In 2010, 8 cases (in donkeys) were notified: 5 in Dobrich province (North-East of the country, near Romania and Black Sea) and 3 in Varna oblast (close to Dobrich).
- In 2010, a seroprevalence survey based on 118 horses found 8 positive cases.

#### Italy:

##### • WNV Surveillance

- WNV surveillance for humans, equine and birds is implemented in Italy. For humans, surveillance of neuroinvasive cases is implemented from 15th June to 30<sup>th</sup> November in areas where animal and human confirmed cases were identified. For equine, active surveillance is implemented on sentinel horses from April to September in "at risk areas". As for birds, there is a permanent passive surveillance in case of abnormal mortality or increase of incidence of mortality in wild birds. Active

surveillance in birds is also in place from March to November in specific areas.

- **Overall circulation**

- In **2010**, 6 provinces reported WNV circulation (in humans, horses and birds).
- In **2011**, 15 provinces reported WNV circulation.
- In 2012, 13 provinces reported WNV circulation.

- **Human cases**

- In **2010**, 3 confirmed WNV human cases were reported in Veneto region.
- In **2011**, 14 confirmed WNV human cases were reported in 6 provinces (Belluno, Venezia, Treviso, Olbia, Oristano, Udine).
- In 2012, 28 confirmed WNV human cases were reported in 7 provinces (Venezia, Treviso, Oristano, Pordenone, Gorizia, Udine, Matera).

- **Equine cases**

- In 2010, 128 confirmed cases were reported in 5 provinces.
- In 2011, 197 confirmed cases were reported in 13 provinces.
- In 2012, 65 confirmed cases were reported in 11 provinces.

**Lineage**

- In 2010 and 2011 lineage 1 was detected in humans in Italy. In 2011, lineage 2 was found in mosquitoes and in humans (but with no evidence of neuroinvasive disease). In 2012, lineage 1 and 2 were reported circulating in the country.

**Greece:**

- **WNV Surveillance**

- Human surveillance for WNV is implemented in Greece.
- Following the 2010 outbreak, surveillance in equine and birds has been strengthened.

- **Human cases**

- Before 2010, a sero-prevalence survey in human population found that 1% of the human population was positive for WNV.
- In **2010**, 262 human infections were diagnosed for the first time in Greece. WNND cases were reported in 11 prefectures.
- In **2011**, 100 WN human infections were reported; WNND were spread over 13 prefectures (one case was imported from Albania).
- In **2012, 161 WN human infections were reported in total. WNND were spread over 15 prefectures.**

- **Equine cases**

- In 2010, 30 confirmed equine cases were reported in 6 prefectures.
- In 2011, 24 confirmed equine cases were reported in 6 prefectures.
- In 2012, 15 confirmed equine cases were reported in 6 prefectures.

- **Lineage**

- In **2010** lineage 2 WNV strain was detected in *Culex pipiens* mosquitoes collected in 2 locations where WNV cases were reported and in two [blood donors](#) residing in the same area. WNV lineage 2 sequences from strains isolated from human and mosquitoes were identical and

show high genetic identity to a Hungarian WNV strain isolated from birds in 2004.

- In 2011 and 2012 WNV Lineage 2 was again identified in humans, mosquitoes and birds.
- Lineage 2 was still identified during the 2012 outbreak.

**France:**

- **WNV Surveillance**

- WNV surveillance for humans, equine and birds is implemented in France.

- **Human cases**

- The last autochthonous human WN cases were reported in 2003 (no autochthonous cases were reported in 2010, 2011 and 2012).

- **Equine cases**

- The last equine cases were detected in 2006.

**Malta:**

- **WNV Surveillance**

- Permanent WNV surveillance for human is implemented in Malta since 2012.
- Since 2011, the country is equipped with kits to detect WNV viral antigen with PCR.

- **Human and equine cases**

- No human or equine cases have been reported in Malta in 2010, 2011 and 2012 (the capacity to detect human cases is effective since 2012 only). The country does not have the capacity to test birds or equine for WNV.
- The *Culex P.* vector is distributed all over the island.

**Romania:**

- **WNV Surveillance**

- WNV surveillance for humans (seasonal) and equine (seasonal and permanent passive surveillance) is implemented in Romania.

- **Human cases**

- In **2010**, 57 human WN cases were reported. Most cases (n=35, 61%) were reported in known endemic areas (southern part of the country). WNV cases have also been reported in areas which were so far unaffected such as in the Central Transylvania and in the Moldavian plateau.
- In **2011** season, 11 WN human cases were recorded; most of them (n=6, 54%) in Bucharest city. The other cases were recorded in known endemic areas: Constanta (2 cases), Galati (1 case) and Tulcea (1 case). One WN human case was recorded in a newly affected area in 2010, Iasi district (Moldavian plateau).
- In 2012, 15 WN human cases were reported. Most of the cases (n=7, 46%) were recorded in Bucharest city. The other cases were reported in the southern parts of the country, known to be endemic for WNV. One WN human case was reported in Iasi district.

- **Equine cases**

- In **2010**, 6 equine cases were reported in Braila and Constanta areas.
- In **2011 and 2012**, no equine case has been reported.
- **Lineage**
  - In 2010 and 2011, molecular investigation revealed that WNV infections were due to a lineage 2 and was related to the 2007 Volgograd (Russia) strain.

#### Spain:

- **WNV Surveillance**
  - Regular WNV surveillance for humans is implemented in Spain. Permanent WNV surveillance for equine and birds are implemented in specific areas at risk in the country.
- **Human cases**
  - In **2010**, 2 WNV human cases were reported in Cadiz province. It was the 2<sup>nd</sup> time human WNV case reported in the country. The 1<sup>st</sup> human case occurred in 2004 and was retrospectively confirmed in 2006. The patient had been diagnosed in an area located in Southern Spain.
  - In **2011 and 2012**, no human case was reported.
- **Equine cases**
  - In **2010**, 39 equine cases have been reported in Cadiz, Sevilla and Malaga provinces. They were the first equine cases ever reported to OIE.
  - In **2011**, 11 equine cases were reported in the province of Cadiz.
  - In 2012, 4 equine cases were reported in the province of Cadiz.
- **Lineage**
  - Lineage 1 was detected in birds in 2007, in mosquitoes in 2008 and in horses in 2010.

### The Balkans

#### Albania:

- **WNV Surveillance**
  - There is a permanent human WN surveillance in the country.
- **Human cases**
  - In **2010**, one case (reported in 2011) was detected in a 14 year-old child in Korçe prefecture (South East, bordering Greece).
  - In **2011**, 49 cases (15 confirmed) of WNV infections have been reported in humans. They were located in the coastal and in the central parts of Albania.
  - The 2010 and 2011 cases were the 1<sup>st</sup> clinical WNV infections reported in Albania. In 1958, WNV antibodies were detected in two human blood samples but no clinical cases were reported.
  - In **2012**, no WN human case was reported in the country .
- **Equine cases**
  - In 2011, a seroprevalence survey in horses found 11% of positive cases.
- **Lineage**

Lineage 2 was detected in the confirmed human cases reported in 2011.

#### Cyprus:

- **WNV Surveillance**
  - There is a permanent human and equine WNV surveillance.
- **Human Cases**
  - No human cases were reported in 2010, 2011 and 2012.

#### Bosnia & Herzegovina

- **WNV Surveillance**
  - There is no human or equine surveillance system implemented in the country.
- **Human cases**
  - In **2012**, 1 WNV human case was reported **for the first time** in the country.
- **Equine cases**
  - In **2011**, 250 horses were tested, all were negative.
  - In 2012, 144 horses were tested, all were negative.

#### Croatia:

- **WNV Surveillance**
  - Permanent human, equine and bird WNV surveillance is implemented in Croatia.
  - Since 2011, WNV cases in equine have to be mandatorily notified.
- **WNV circulation**
  - A sporadic evidence of infection has been found in asymptomatic individuals.
  - In 2001 and 2002, WNV infection was serologically confirmed in horses in Dakovo region (Eastern Croatia) in 4 out of 980 tested horses.
  - In 2011, a low intensity of WNV was found through sera testing in horses (veterinary surveillance. Seroprevalence surveys also showed a higher intensity in horses in the Eastern and continental parts of the country).
- **Human cases**
  - In **2012**, 6 WNNND human cases were **reported for the first time** in Croatia (they have been laboratory confirmed in Italy).
- **Equine cases**
  - In 2012, 12 equine cases were reported.

#### FYROM:

- **WNV Surveillance**
  - Equine and birds surveillance were implemented in 2011 while permanent surveillance in humans was previously established.
- **WNV circulation**
  - In 2010, over 190 serums randomly selected 21 (11%) were IgG positive for WNV.
  - In 2011, over 56 serums randomly selected 2 (3%) were IgG positive for WNV.
  - In 2012, over 153 serums randomly selected 24 (16%) were IgG positive for WNV.
- **Human cases**



- In **2011**, 4 WNV human cases were reported **for the first time** in the country.
- In **2012**, 6 WNV human cases were reported in the country.
- **Equine cases**
  - In **2010**, no equine case was reported.
  - In **2011**, 10 horses were reported to OIE.
  - In **2012**, no equine case was reported.

#### Kosovo:

- **WNV Surveillance**
  - There is a permanent passive human WNV surveillance.
- **Human cases**
  - In **2012**, 6 WNV human cases were reported **for the first time** in the country.
- **Equine cases**
  - No equine case was reported in 2010, 2011 and 2012.

#### Montenegro:

- **WNV Surveillance**
  - Permanent human WNV surveillance is implemented in Montenegro since 2012.
- **Human cases**
  - In **2012**, 1 WNV human case was reported **for the first time** in the country.
- **Equine cases**
  - No equine case has been reported in the country in 2010, 2011 or 2012.

#### Serbia:

- **WNV Surveillance**
  - There is WNV surveillance for humans (in process in 2011) in Serbia.
- **Human cases**
  - In **2012**, 71 WNV human cases were reported **for the first time** in the country; with 74,6% located in Belgrade (n=53).
- **Equine cases**
  - In 2011, a seroprevalence survey showed 42 sero-positive horses out of 349.
- **Lineage**
  - Lineage 2 was detected in mosquitoes in 2007, in mosquitoes in 2012.

#### Slovenia:

- **WNV Surveillance**
  - WNV human surveillance is implemented since 2008. WN is a compulsory notifiable disease in Slovenia if cases present acute encephalitis or meningitis symptoms.
- **Human and equine cases**
  - No human or equine cases were reported in Slovenia in 2010, 2011 and 2012.

## North Africa and Middle-East

### Algeria:

- **WNV Surveillance**
  - There is no specific WNV surveillance system implemented in the country.
- **Human and equine cases**
  - The latest large human outbreak was reported in 1994 in the south of the country. About 50 suspect cases including 8 deaths were reported. Among the 18 samples collected, 16 had WNV antibodies.
  - In **2011** a seroprevalence survey in humans showed that among the 165 samples 16 (10%) tested positive for WNV antibodies.
  - In 2010 and 2011 neither WN human or equine cases were reported in the country.
  - In **2012**, 1 WNV human case was reported in Algeria (In Jilel, in the North of the country) for the first time since 1994. This case was imported from Algeria and diagnosed in France.
  - In 2012, a seroprevalence study among 15 suspect cases in Alger showed all cases were negative.

### Egypt:

- **WNV Surveillance**
  - There is no information on any specific WNV surveillance system implemented in the country.
- **WNV circulation**
  - In 2010, 2011 and 2012, no human or equine cases were officially and publicly reported in Egypt.
  - A prospective [cohort study](#)<sup>11</sup> carried out in Egypt in 5 study sites between 1999 and 2002 showed that 24% (1.431/5.965) of the enrolled individuals had WNV-IgG antibodies. In the 3 Nile valley sites, a 15% seroconversion rate was observed among people enrolled.

Seroprevalence rates were significantly higher than in the 2 sites located in the Sinai. High seroconversion rates were also detected among the sentinel chicken and WNV were isolated from both chicken sera and mosquito pools.

The authors of this study suggest that WNV is circulating in human in Egypt especially in the Nile Delta and in the Nile valley where the majority of the Egyptian population lives.

### Israel:

- **WNV Surveillance**
  - Permanent WNV surveillance for humans, equine and birds is implemented in the country.
- **WNV circulation**
  - Israel is on a major birds' migration route between Eurasia and Africa. WNV is endemic in Israel since 1947 and caused large outbreaks in the 1950's followed by an interruption of transmission between 1974 and 2000.
- **Human cases**

<sup>11</sup> Soliman A, Mohareb E, Salman D, Saad M, Salama S, Fayez C, et al. Studies on West Nile virus infection in Egypt. J Infect Public Health. 2010;3(2):54-9

- The biggest outbreak (435 cases) occurred in 2000, followed by smaller outbreaks in 2005 (102 cases), and 2007 (107 cases).
- In 2010, 109 human cases were reported.
- In 2011, 45 cases were reported.
- In 2012, 101 cases were reported.

#### • Equine cases

- In 2010, 8 cases in horses were reported.
- In 2011, 11 equine cases were reported.
- In 2012, 34 equine cases were reported.

### Morocco:

#### • WNV Surveillance

- Permanent WNV surveillance system for human and equine is implemented in the country while seasonal surveillance is in place for birds.

#### • Human cases

- No WNV human infections were reported in 2010 and in 2011.
- The first human WNV infection was reported in 1996 (1 case) during an outbreak among horses (94 cases including 42 deaths). Since then, no human infection has been reported.
- In 2010, a serological survey in humans identified 11 positive cases (IgM positive), these results are in favour of a recent WNV circulation in the country.

#### • Equine cases

- 2010, 24 equine cases (including 10 deaths) were reported in Benslimane, Khemisset, Mohammedia and Casablanca provinces.
- The previous equine WN outbreak occurred in September and October 2003 in the province of Kenitra (8 equine cases including 5 deaths).
- Following the 2010 WN outbreak, Morocco reinforced veterinary controlled measures (including horse vaccination campaigns).
- In 2011 and 2012, no equine cases were reported.

### Jordan:

#### • WNV Surveillance

- Permanent human WNV surveillance is implemented in the country.
- Seasonal equine and bird surveillance is also implemented.

#### • Human cases

- In 2011, 2 suspect cases were reported but they could not be biologically confirmed.

### Lebanon:

#### • WNV Surveillance

- There is no specific WNV surveillance system implemented in Lebanon.

#### • Human and equine cases

- No human or equine cases have been reported in Lebanon in 2010, 2011 and 2012.
- A seroprevalence [survey](#) done in Beirut in 2006 among blood donors showed that less than 1% of the 639 individual were positive.

### Libya:

#### • WNV Surveillance

- A permanent human surveillance is implemented in Libya.

#### • Human and equine cases

- No WNV human or equine infections were reported in 2010, 2011 and 2012.

### Palestine:

#### • WNV Surveillance

- WNV surveillance for humans (permanent and seasonally enhanced), horses and birds (seasonal for both) is implemented in the country.

#### • Human cases

- In previous years, cases occurred in 2006 (3 WNV cases in Qalqelia district), 2008 (2 cases in Qalqelia) and 2009 (one case in Jericho).
- In 2010, one human autochthonous case was reported in Tulkarem.
- In 2012, 2 human cases were reported in the country (Jericho and Ramallah).

#### • Equine cases

- No equine case was reported in 2010, 2011 and 2012.

### Syria:

#### • WNV Surveillance

- There is no specific WNV surveillance but reported suspect cases are investigated.

#### • Human and equine cases

- No human or equine cases were reported in 2010, 2011 and 2012 in the country.

### Turkey:

#### • WNV Surveillance

- Permanent WNV surveillance system for humans (passive surveillance) and equine is implemented in Turkey. WNV infections are included in national mandatory notifiable diseases list.

#### • Human cases

- In 2010, 47 human cases (including 10 deaths) were reported in Aegean and Marmara regions. These were the first cases ever reported in the country.
- In 2011, 5 human cases including 3 probable in the western coastal provinces of Antalya, Mugla and Sakarya and 2 confirmed human cases in Aydin and Antalya provinces were reported in Turkey. Seroprevalence surveys have been implemented in the country to better document viral circulation.

- In 2012, 13 human cases were reported in the country, including 3 confirmed (1 in Edirne and 2 in Ankara) and 10 probable cases in the Mediterranean coast and other provinces.
- In 2012, a seroprevalence study conveyed in 1993 samples from Sakarya, Eirne, Mugla and Manisa provinces found an 11% IgG positive.

#### • Equine cases

- In 2010, 2 equine cases were reported in Izmir province (Aegean region).

#### • Lineage

Lineage 1 was detected in the first human case reported in 2012.

### Tunisia:

#### • WNV Surveillance

- WNV surveillance system for humans is implemented in Tunisia. Seroprevalence study is implemented in equine in places where confirmed human cases are identified.

#### • Human cases

- Previous human cases were reported in 2003: 31 confirmed human cases were detected in Monsatir, Mahdia, Sousse, Sfax and Gabès governorates.
- In 2010, 3 human cases were reported in Jendopuba and Tataouine.
- In 2011, 3 human cases were reported in Kebili (South-west of the country).
- In 2012, 86 human cases were reported in 13 of the 24 governorates of the country.

#### • Equine cases

- No equine case was reported in 2010, 2011 and 2012.

## Non EpiSouth neighbouring countries

### Russia:

- In 2010, from 16 July to 4 October at least 552 human cases including 6 deaths were reported to MoH. Of these cases, 409 cases (including 5 deaths) were reported in Volgograd province (77% in Volgograd city). The other cases were reported in Rostov, Voronezh, Krasnodar, Astrakhan, Kalmoukia, Tatarstan and Chelyabinsk oblasts.
- In 2011, 153 cases were reported in the country, including 61 in Volgograd province. In comparison to 2010, one additional oblast was affected (Tambov) while no case was reported in Chelyabinsk).
- In 2012, 447 cases were reported in the country, including 210 (47%) in Volgograd province.

### Hungary:

- In 2010, 11 confirmed human cases were reported by Hungarian health authorities.
- In 2011, 3 WNV human cases were reported in Hajdu-Bihar (North East of the country), Pest and Szabolcs-Szatmar-Bereg counties<sup>12</sup>.
- In 2012, 12 human cases were reported in 10 provinces of Hungary.

### Ukraine:

- In 2010, no human WNV case was reported.
- In 2011, 8 WNV cases were reported in humans in 3 different oblasts: Donets'ka (3), Mykolayivs'ka (2) and Zaporiz'ka (3).
- In 2012, 12 human cases were reported in Poltavs'ka oblast.

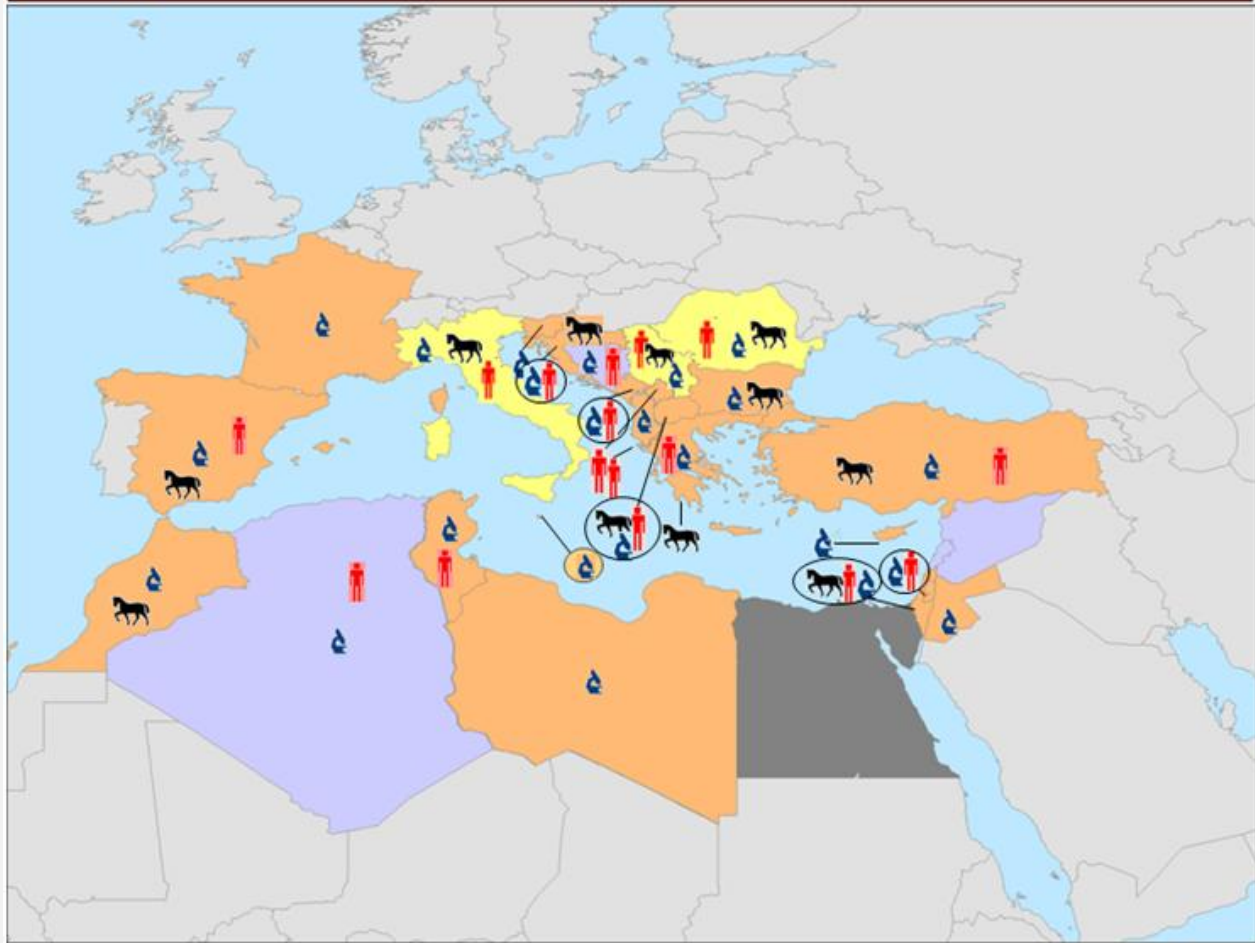
## Conclusion

- Although number of reported cases was lower in 2011, the 2012 season confirmed the unusual WNV dynamic in the Mediterranean basin observed since 2010. During those three years, human and equine cases were reported across the region in Southern Europe, North Africa, Balkan and Middle East areas.
- In 2011, in comparison to 2010, fewer human cases were reported but additional affected areas were reported with previously affected countries (Albania, Italy, Greece, Romania and Tunisia) and also in a not previously affected country (FYROM). Nevertheless on a larger scale the affected region remained comparable to the one observed in 2010.
- In 2012, the total number of human cases is at its highest since 2010, with a total of 15 EpiSouth countries reporting human cases, including 6 for which it has been the first time ever. These 6 new affected countries are all located in the Balkans.
- WNV circulation in 2012 has been also particularly intense in North Africa with a large increase of cases in Tunisia (the number of human cases was multiplied by 28 compared to 2011) and with the first reported case in Algeria since the 90s.
- On overall, during the 2010, 2011 and 2012 seasons, viral circulation was more intense in the Eastern part of the Mediterranean while viral activity remained moderated in the Western part (except for Tunisia).
- Lineage 2 was isolated in at least 3 countries of the Eastern part of the region and in Italy, while lineage 1 was detected in the west only. The concomitant circulation of two different strains across the area seems likely.
- The introduction of a lineage 2 strain in the recent years in the eastern part of the Mediterranean area could explain the intensified WNV viral circulation observed in the Balkan and Black Sea area in 2010, 2011 and 2012. Unfortunately, data are insufficient to fully validate this hypothesis.
- The co-circulation of Lineages 1 and 2 in Italy may suggest an introduction of the Lineage 2 in Western Europe with an impact on the virulence of the disease that is difficult to predict.
- Genetic information allowing describing viral circulation in 2010-2012 is too scarce to allow detailed description of the WNV dynamic.
- During both years main outbreaks occurred on sites located in the main bird migration routes and sustained transmission cannot be excluded in the coming years.

<sup>12</sup> Cf. [ECDC](#)

## MAP 2

### 2012 West Nile surveillance, laboratories and WNV circulation in EpiSouth countries, as of 11/04/2013



Data EpiSouth / map DI-InVSI/ esri basemap

#### Human WNV surveillance (areas or whole country)

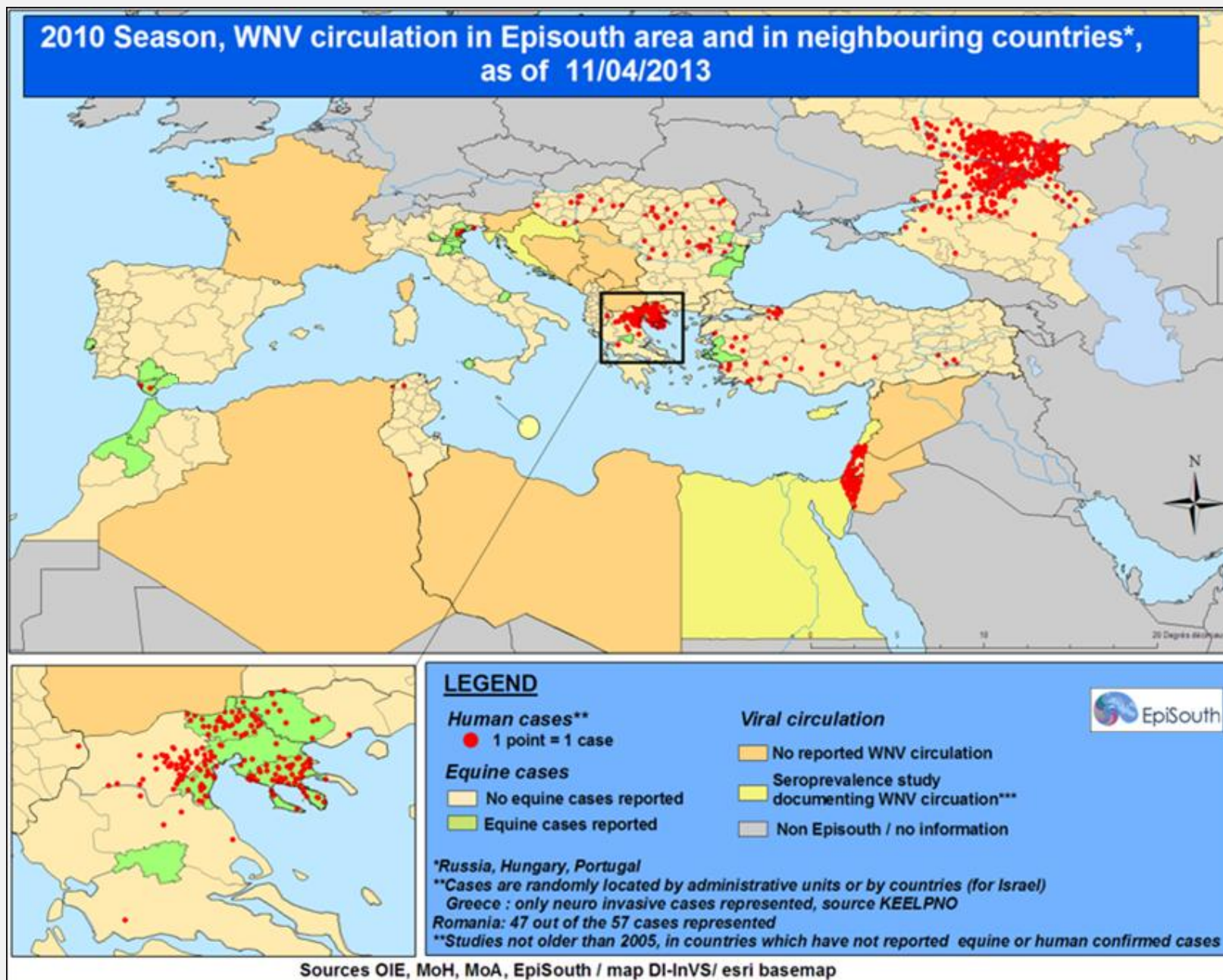
- |                        |                        |
|------------------------|------------------------|
| Permanent surveillance | No information         |
| Seasonal surveillance  | Non EpiSouth Countries |
| No WNV surveillance    |                        |

#### Lab, human & equine WNV cases

- Functional WNV reference laboratory
- WNV Human cases (2010, 2011 and/or 2012)
- WNV equine cases (2010, 2011 and/or 2012)

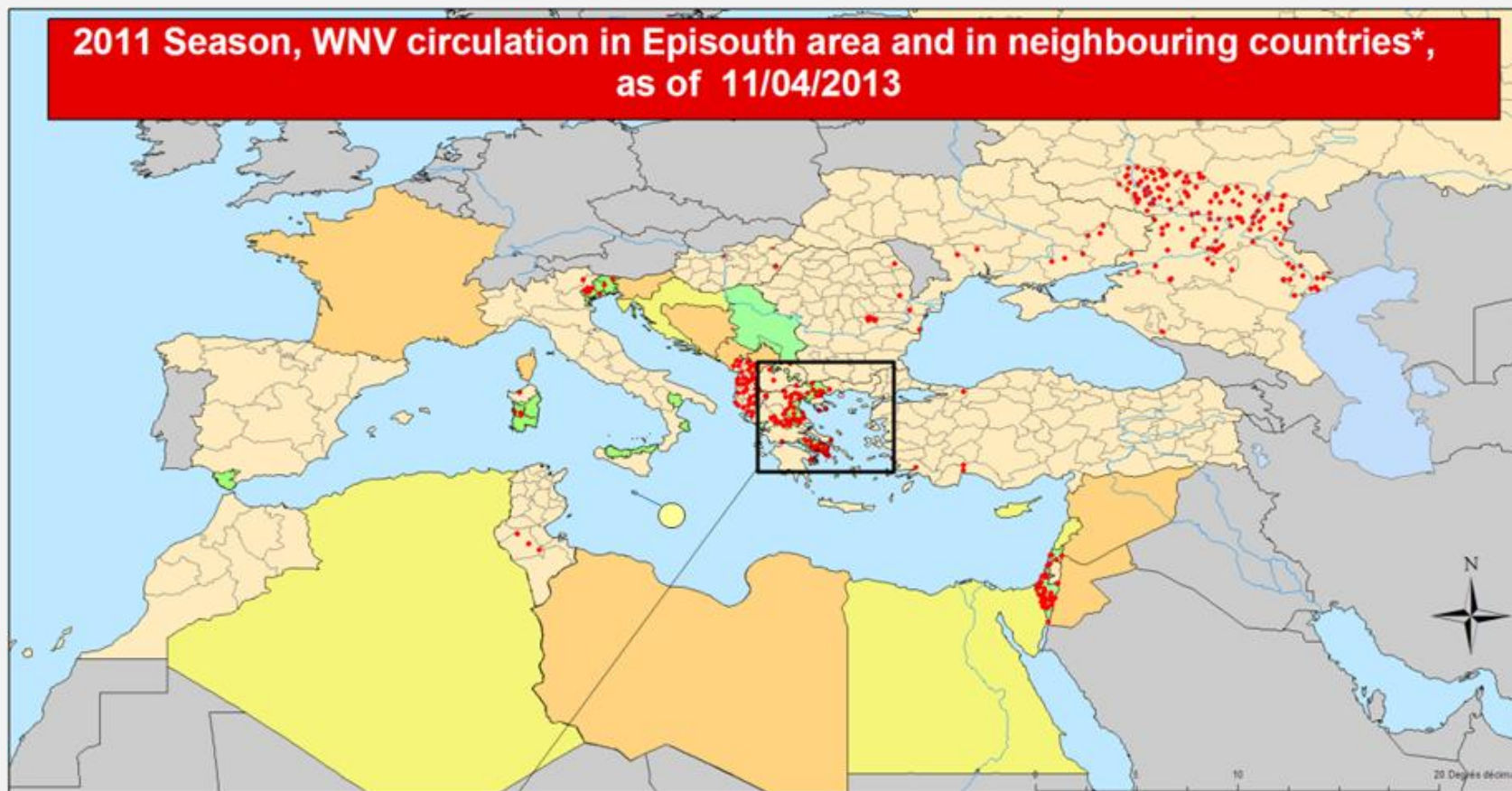


MAP 3



MAP 4

**2011 Season, WNV circulation in Episouth area and in neighbouring countries\*, as of 11/04/2013**



### LEGEND

#### Human cases\*\*

● 1 point = 1 case

#### Equine cases

□ No equine cases reported

■ Equine cases reported

#### Viral circulation

□ No reported WNV circulation

■ Seroprevalence study documenting WNV circulation\*\*\*

□ Non Episouth / no information

\* Russia, Hungary, Ukraine

\*\* Cases are randomly located by administrative units or by countries (for Albania, Israel and FYR-Macedonia)

Greece : only neuro invasive cases represented, source KEELPNO

Romania: only confirmed cases represented

\*\*\*Studies not older than 2005, in countries which have not reported equine or human confirmed cases

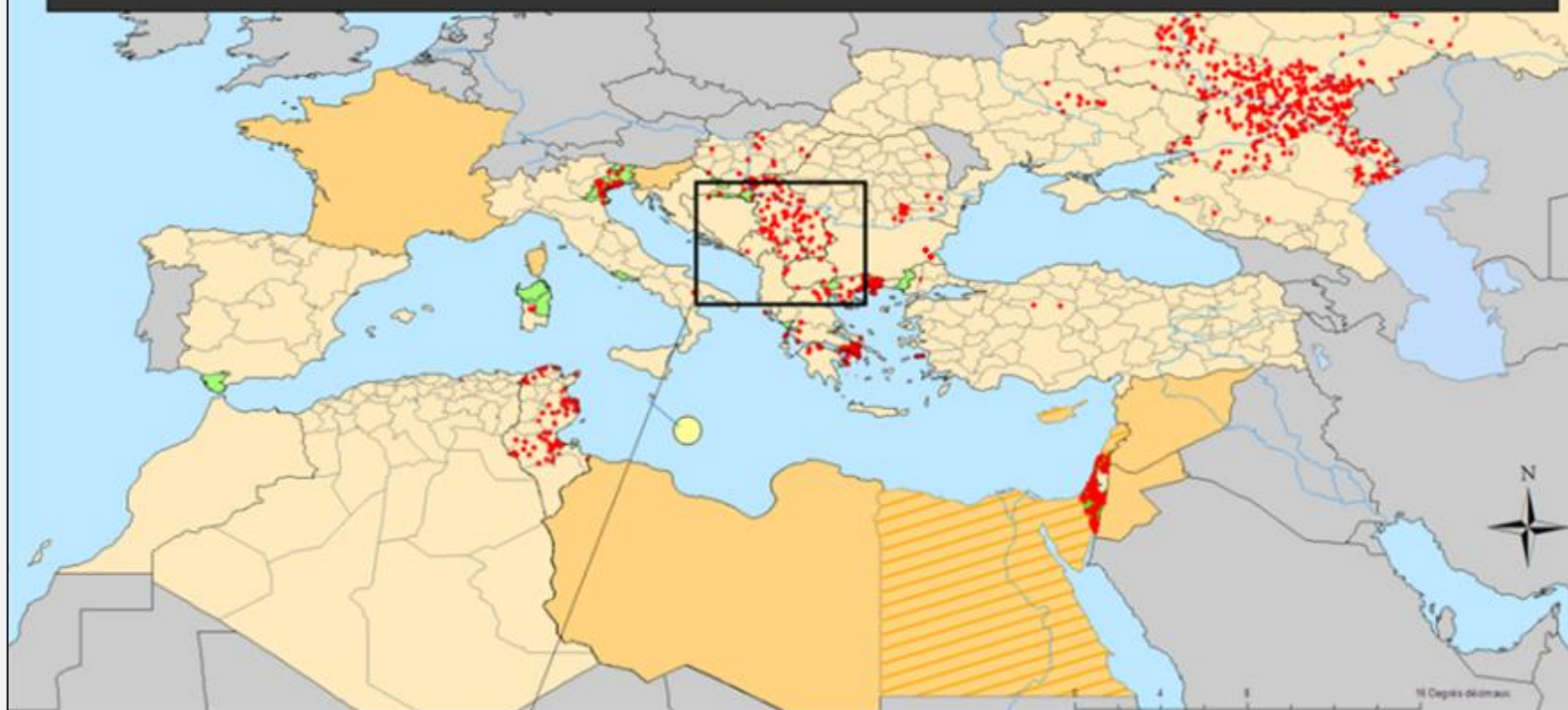


Sources OIE, MoH, MoA, EpiSouth / map DI-InVS/ esri basemap



MAP 5

**2012 Season, WNV circulation in Episouth area and in neighbouring countries\*, as of 11/04/2013**



**LEGEND**

**Human cases in 2012 \*\***

● 1 point = 1 case

**Equine cases in 2012**

□ No equine cases reported  
 ■ Equine cases reported

**Viral circulation**

□ No WNV clinical human infection reported in the past 3 years  
 ■ WNV circulation reported in the last 3 years  
 ■ Seroprevalence study documenting WNV circulation\*\*\*  
 □ Non Episouth / no information

\* Russia, Hungary, Ukraine

\*\* Cases are randomly located by administrative units or by countries (for Israel, FYRO Macedonia, Kosovo, Montenegro, Bosnia-Herzegovina and Serbia)

Greece : only neuro invasive cases represented, source KEELPNO

Italy and Turkey: only confirmed cases are represented; Croatia: only 5 cases represented

\*\*\*Studies not older than 2005, in countries which have not reported equine or human confirmed cases



Sources OIE, MoH, MoA, EpiSouth / map DI-InVS/ esri basemap