

West Nile Virus Infections in Europe

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The West Nile Virus (WNV)

Flaviviridae – Flavivirus - Japanese encephalitis serocomplex

Lineage 1

- widespread
- highly pathogenic, neuroinvasive

Lineage 2

- Sub-Saharan Africa and Madagascar
- Europe
- neuroinvasive strains

Transmission cycle

The Carrier



The Virus

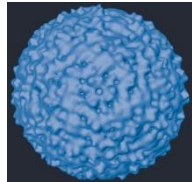


Image:Purdue U.

Incidental hosts



Amplifier, Reservoir, Distributor

WNV infections

- asymptomatic
- Hu: WNV fever
- Hu: 1% neurological disease, polioencephalomyelitis
Eq: 10%

Clinical manifestation:

strain

individual factors

presence of antibodies against other flaviviruses

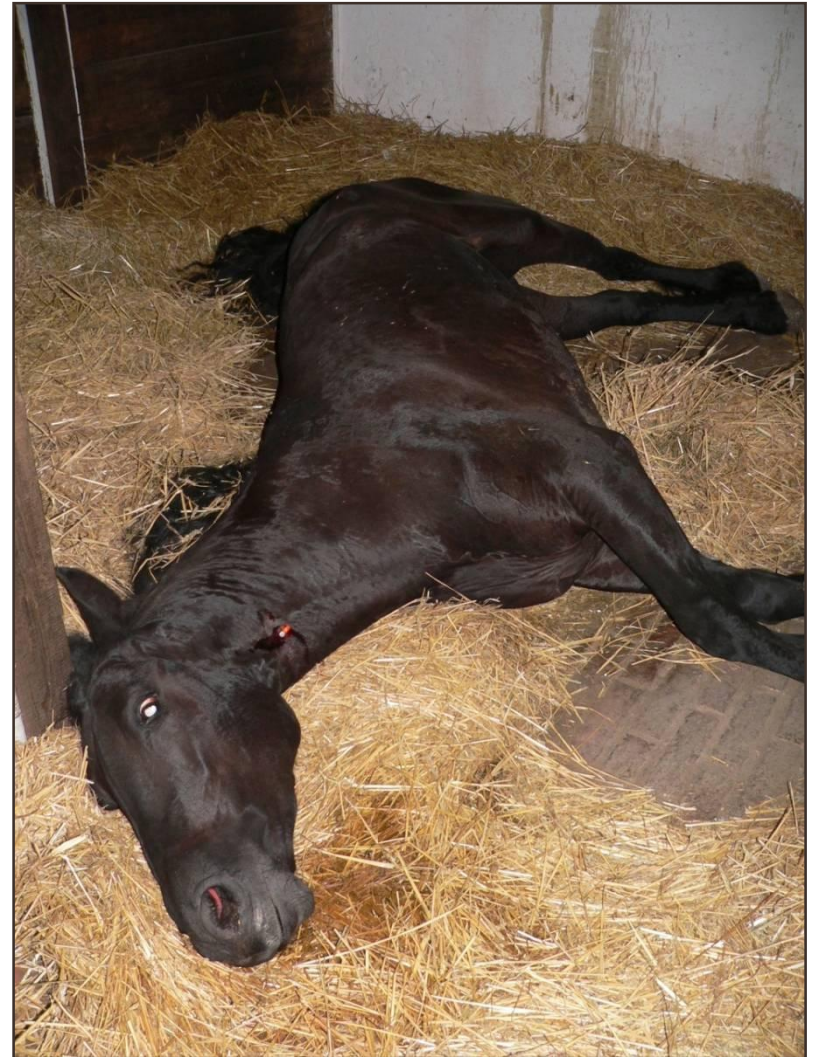
Clinical signs

- non-specific signs
 - general depression
 - loss of appetite
 - low-grade fever
 - colic-like symptoms
 - lameness, stiffness
 - poor performance

Clinical signs

Clinical manifestation	% of horses
Weakness (forelimb?)	78
Ataxia (forelimb?)	72
Muscle fasciculations	39
Recumbency	39
Hyperesthesia	28
Cranial nerve deficit	28
Asymmetric gait	22
Behavioural abnormality	17

Clinical signs



Clinical signs





Laboratory parameters

- **Haematology:** +/- increased white blood cell count & neutrophilia
- **Metabolic profiles:**
non diagnostic
- **Cerebrospinal fluid:** high protein +/- pleocytosis with lymphocytes or neutrophils

WNV outbreaks

- between August and November
- horses showing neurological symptoms
- diagnosis based on
 - ▣ **epidemiology**
 - ▣ **clinical signs**
 - ▣ **serology**

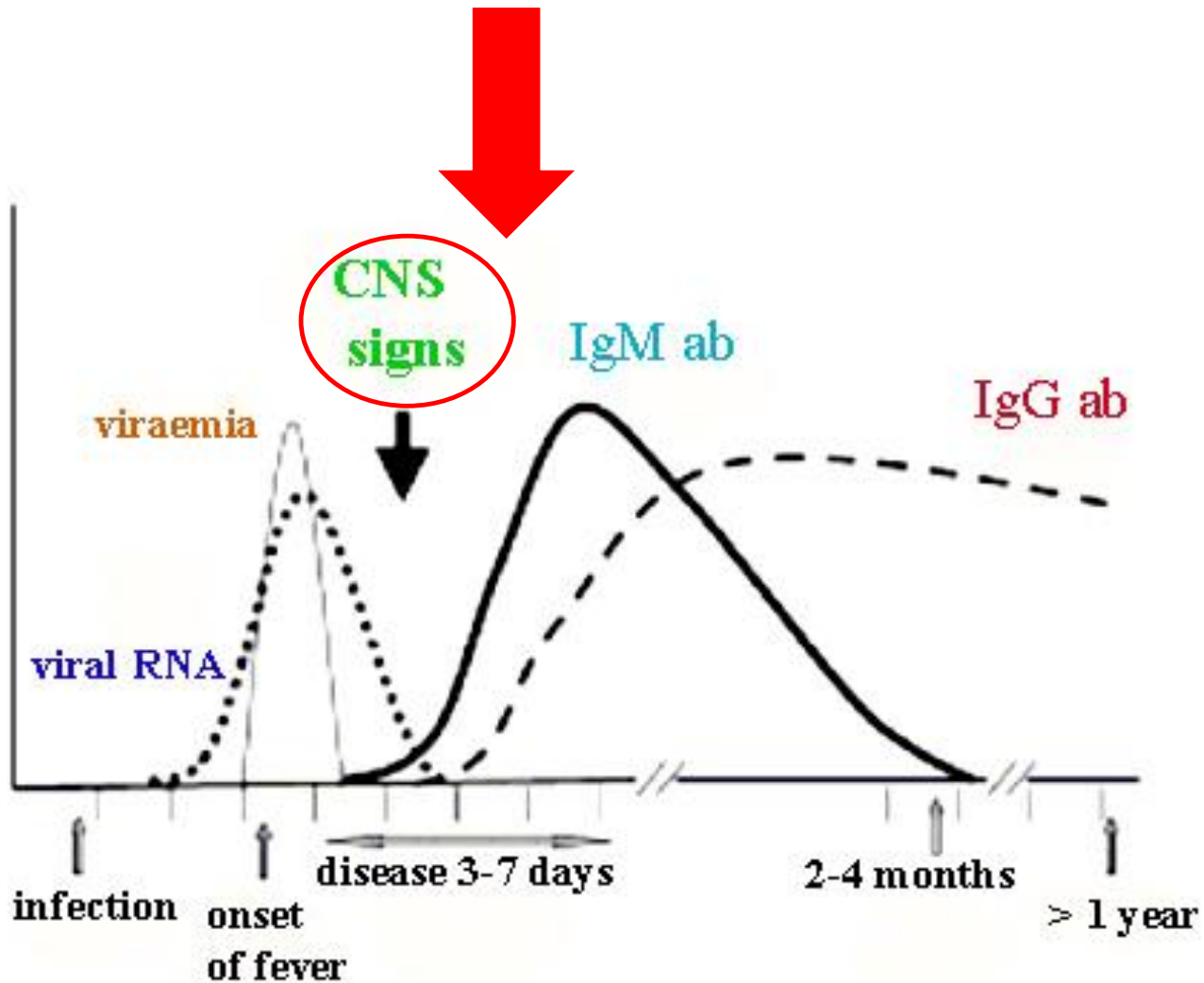
 - ▣ **postmortem: histopathology, PCR, virus isolation**

Serology

- IgM ELISA
- IgG ELISA
- PRNT
- extensive cross-reactive antibody response to other Flaviviruses (molecular tests)

- urine?

Diagnostics



Differential Diagnosis

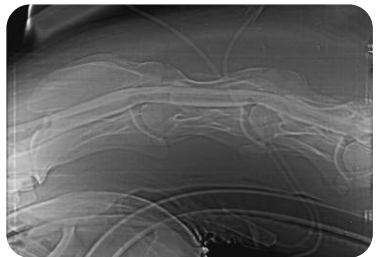
Colic

Nervous system

Lamness



- ❑ Wobbler-syndrome (CVM)
- ❑ Trauma
- ❑ Equine Herpesvirus Encephylomyelitis
- ❑ Rabies, Borna
- ❑ Parasitic migration
- ❑ Bacterial meningitis
- ❑ Degenerative myeloencephalopathia
- ❑ Botulism
- ❑ Tick-borne encephalitis
- ❑ Other myelo/encephalopathies



IgM Elisa positivity is not a diagnosis!

Scenario:

- 13 years old pony
- neurologic signs started in April
- progressive ataxia, dysphagia, pharyngeal, laryngeal paralysis
- IgM Elisa positive in July
- Vaccinated 2 years ago?

RESPE



The screenshot shows the RESPE website interface. At the top left is the RESPE logo with the text "Réseau d'Epidémiologie-Surveillance en Pathologie Equine". To the right is a search bar with the text "Rechercher" and a magnifying glass icon. Below the logo is a navigation menu with links: "PRÉSENTATION", "ACTUALITÉS", "ALERTES", "SOUS RÉSEAUX", "BASE DOCUMENTAIRE", "BULLETINS", and a red button labeled "Déclaration en ligne". The main content area features a large image of a horse's head wearing a straw hat. To the right of the image is the article title "Un cas de fièvre de West Nile - Komaron-Esztergom - Hongrie" and the date "jeudi 6 Août 2015". Below the title is a table with details of the case. At the bottom right of the article is a small ambulance icon with the text "RESPE".

RESPE
Réseau d'Epidémiologie-Surveillance en Pathologie Equine

Contact | Rechercher

🏠 | PRÉSENTATION | ACTUALITÉS | ALERTES | SOUS RÉSEAUX | BASE DOCUMENTAIRE | BULLETINS | Déclaration en ligne ➔

Accueil

Un cas de fièvre de West Nile - Komaron-Esztergom - Hongrie

jeudi 6 Août 2015

Un cas de fièvre de West Nile - Komaron-Esztergom - Hongrie

Maladie	fièvre de West Nile
Nombre de prélèvement(s)	1
Date de confirmation	04/07/2015
Symptômes	syndrome neurologique
Nombre de chevaux affectés	1
Effectif total	26
Mesure(s) de contrôle	dépistage

Source : International Collating Center (GB)



Outcome

- 30% died, 70% recovered, 30% residual CNS signs



Serosurvey

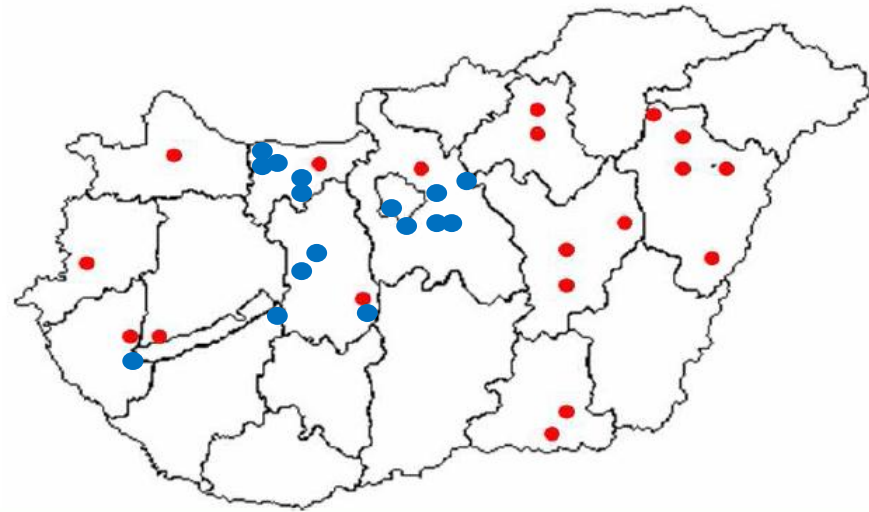
	Number of premises	Tested	Positive	Showing clinical signs	Dead	% of positive animals	% positive animals showing clinical signs	Case-fatality rate %
Affected premises	15	105	47	18	5	44,7	38,3	27,8
Non-affected premises	3	184	45	0	0	24,4	0	0
Total	18	289	92	18	5	31,8	19,5	27,8

Hungary

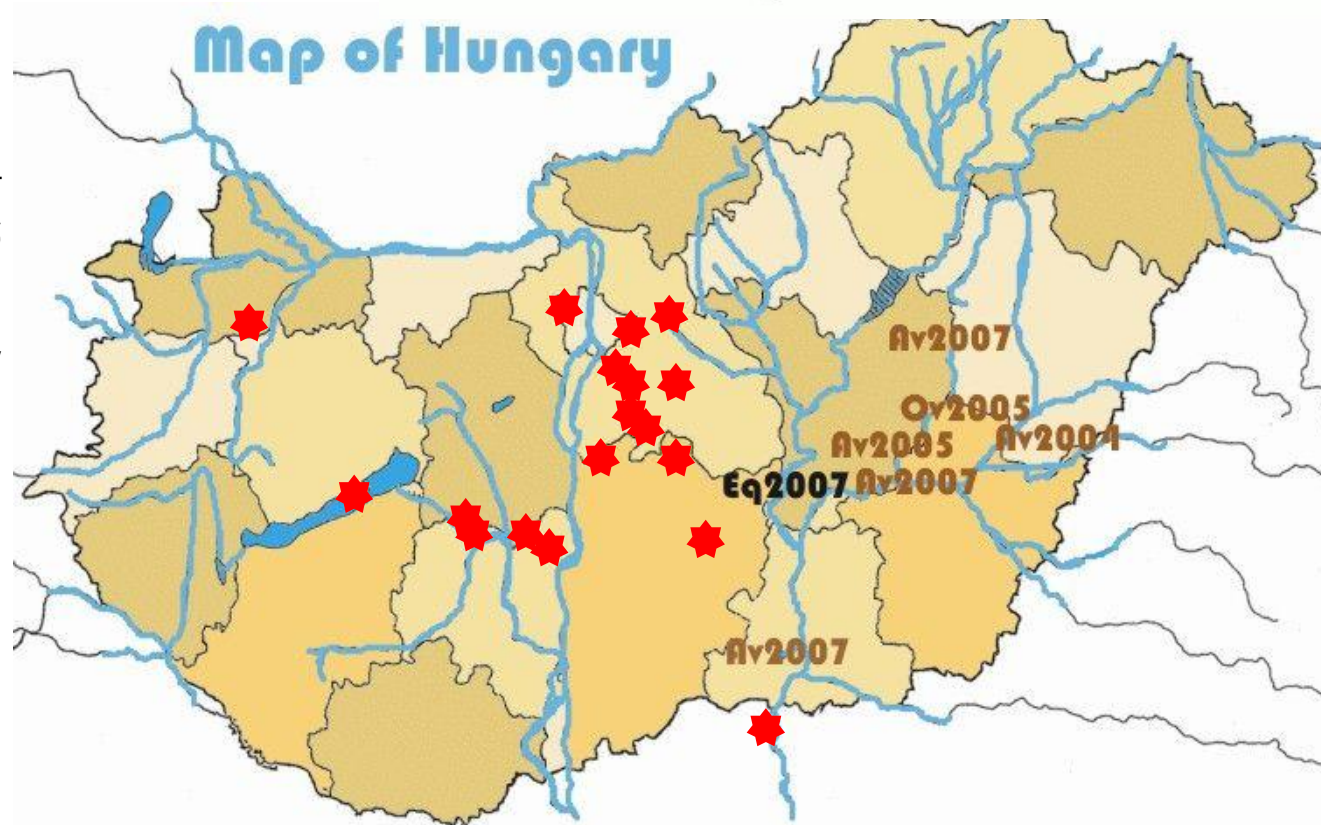
- both lineage 1 and 2 strains circulating
- clinical cases by lineage 2 strains

Case distribution

● Human cases in 2008 ● Avian cases (hawks) in 2008



Av2004: avian WNVcases in 2004
Av2005: avian WNVcases in 2005
Ov2005: sheep encephalomyelitis
Av2007: avian WNVcases in 2007
Eq2007: first equine
encephalomyelitis in 2007



Equine cases in 2008 ★

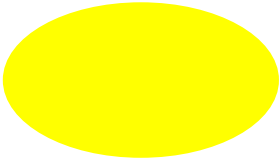
Europe 2008-2012



Lineage 2 strain



Lineage 2 strain



Lineage 1 strains



Reported cases of West Nile fever for the EU and neighbouring countries

Transmission season 2010; latest update: 05/06/2013



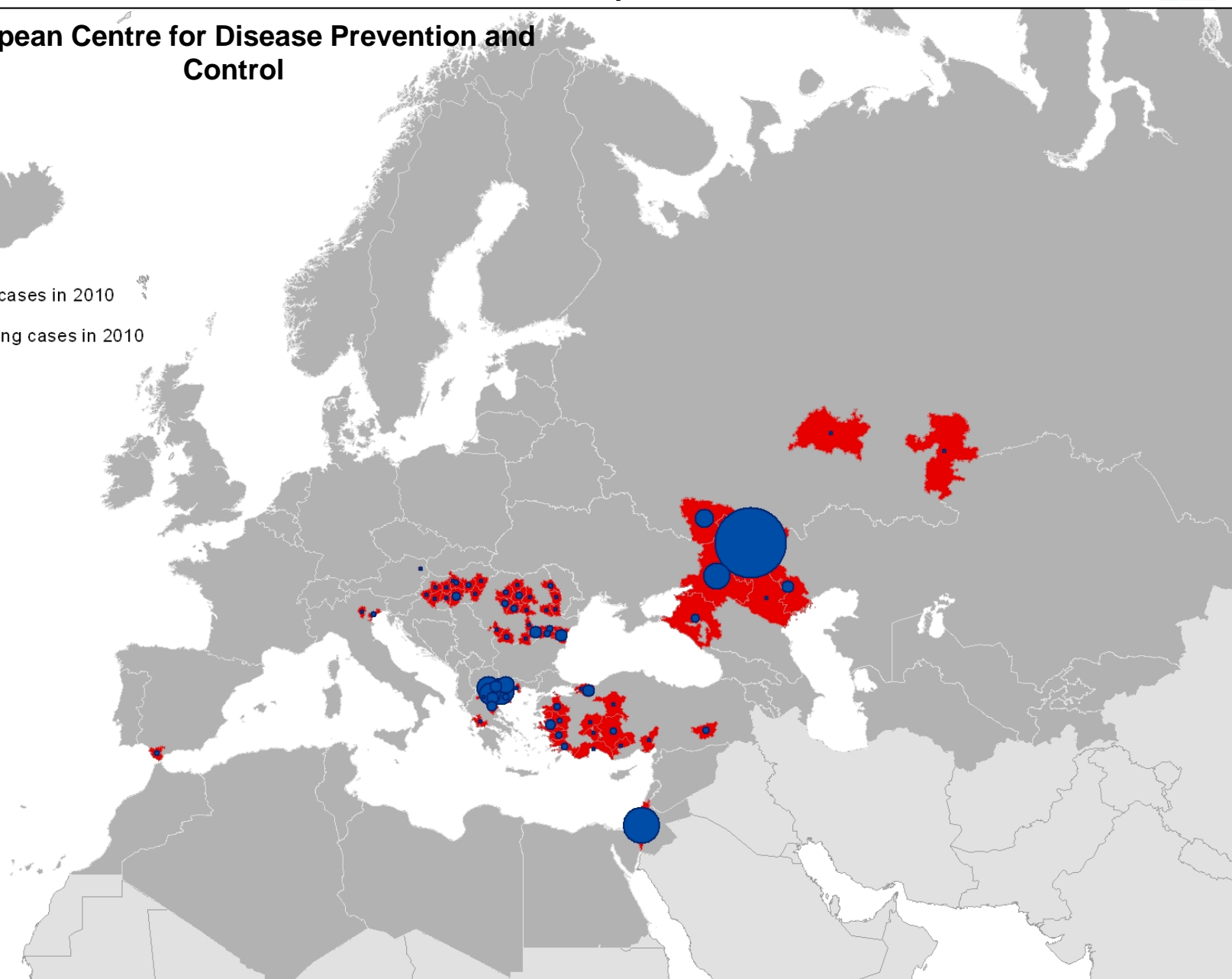
European Centre for Disease Prevention and Control

- Area reporting cases in 2010
- Area not reporting cases in 2010
- Not included

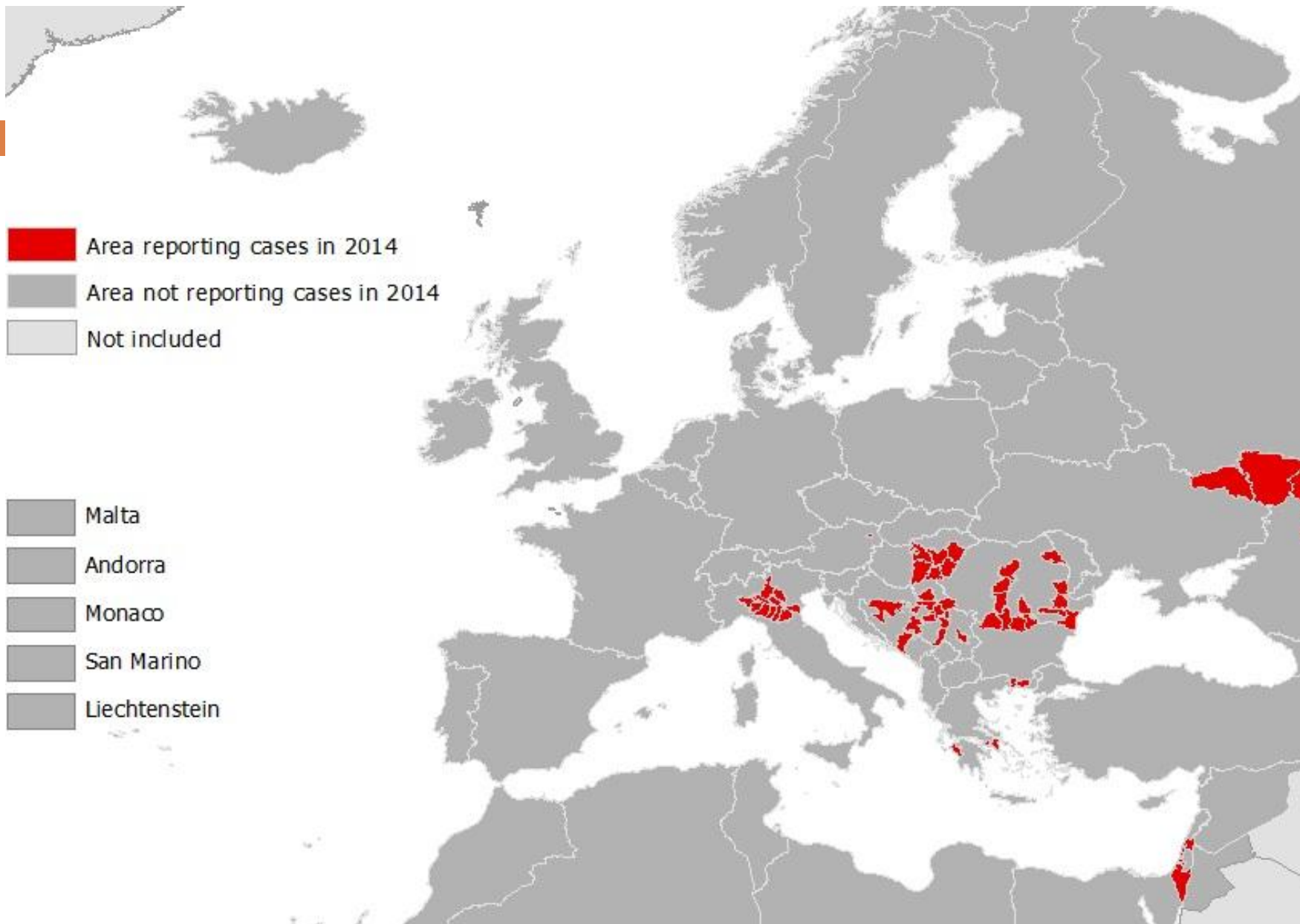
Number of cases

- 1
- 5
- 10
- 50
- 100

- Malta
- Andorra
- Monaco
- San Marino
- Liechtenstein



ECDC data

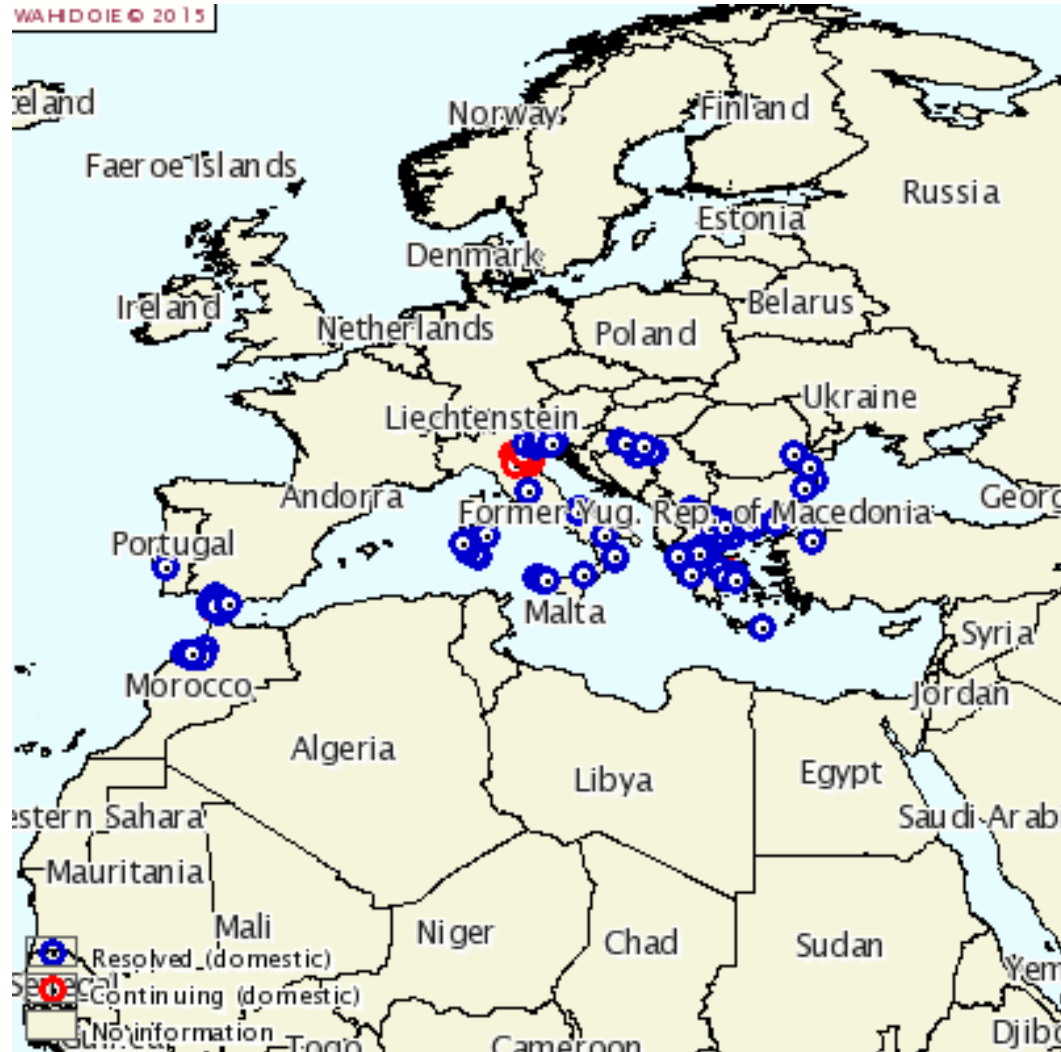


Human data 2014 AUG-OCT

country	Number of cases
Austria	1
Greece	15
Hungary	11
Italy	24
Romania	23
Bosnia and Herzegovina	13
Russian Federation	29
Serbia	76

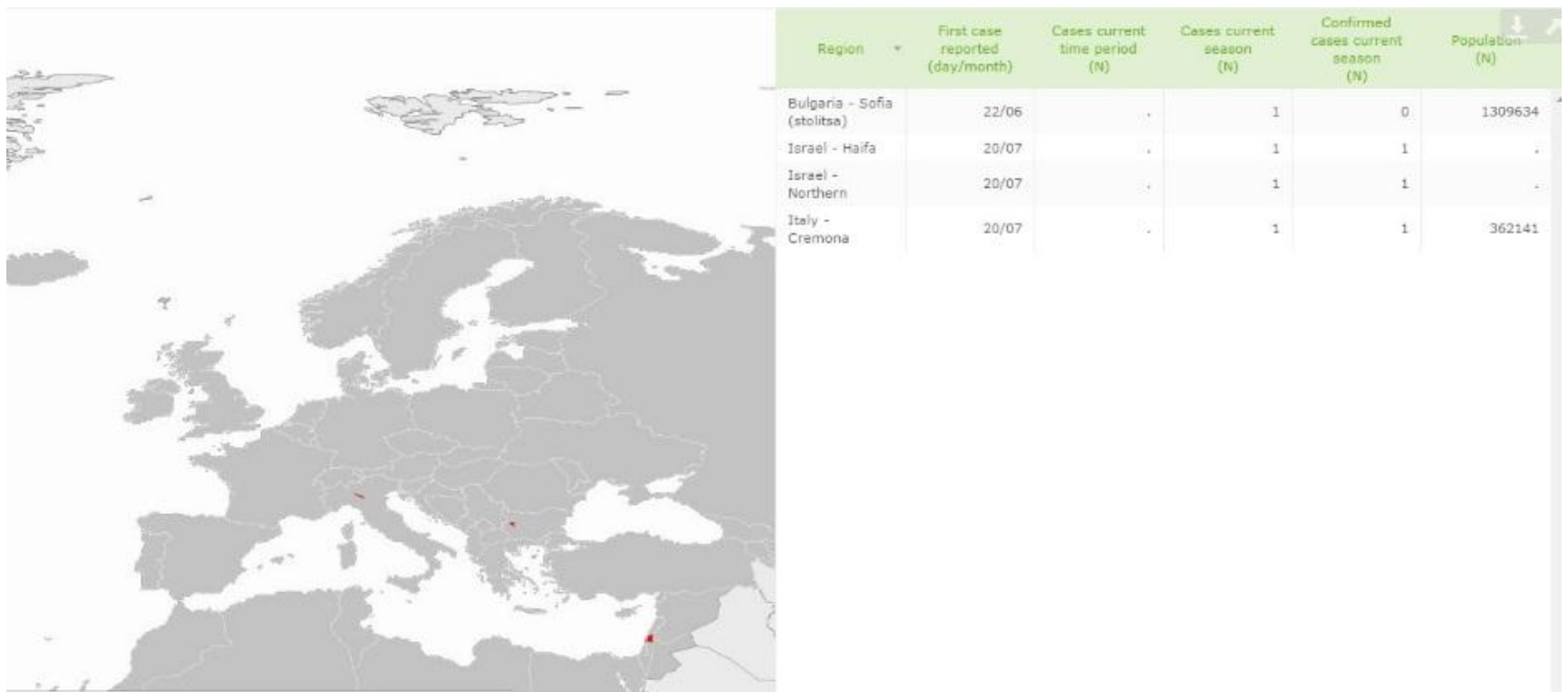
ECDC data

OIE reported 2008-2015





2015



ECDC data

Prevention

- Vaccination
- Education, information
- Need for persistent serosurvey and virus isolation



One bite. One life changed forever. **Protect yourself.**

West Nile Virus can strike anyone of any age. And one out of five who are infected will suffer a debilitating illness that can last a lifetime. Worse yet, some will actually lose their life. Take action and protect yourself all summer.

Remember the four Ds:

- Use DEET-enhanced insect repellent. (2% soy-based, organic products also available.)
- DRESS in long sleeves and pants.
- Avoid the outdoors from DUSK to DAWN.
- DRAIN standing water outside your home.

For more information call the West Nile Virus Hotline at 303.441.1460. Or visit www.bouldercountymosquito.net.



BOULDER COUNTY
Public Health

Postvaccination IgG, IgM

GROUPS	HIT RESULTS IgG
1: naturally infected (positive)	38 (30,89%)
2: non-infected (negative)	85 (69,11%)
3: double primovaccination and seropositive 12 months later	57 (86,36%)
4: double primovaccination and seronegative 12 months later	9 (13,64%)
5: double primovaccination + yearly booster and seropositive 12 months later	11/11 (100%)
Horses included in the study	200

Group	IgM seropositivity after vaccination (booster or 1 st primovaccination)		IgM seropositivity after vaccination (2 nd primovaccination)	
	IgM Elisa	HIT IgM	IgM ELISA	HIT IgM
1	1/7	2/7	1/7	0/7
2	0/7	0/7	1/7	1/7
3	2/7	0/7		
4	4/7	1/7		
5	2/7	0/7		

- Lineage 1 vaccines are protective

The West Nile Virus (WNV)

- zoonotic
- reportable to EU
- in Hungary: IgM ELISA only NFCSO central lab
- test paid by the state
- actions: report exact GPS coordinates, in case of a death PCR analysis

Outbreaks

- non-predictable
 - eg. 2012 USA, 286 human deaths in Texas
 - Macedonia, Greece: 2010-2011

Thank you for your attention!

