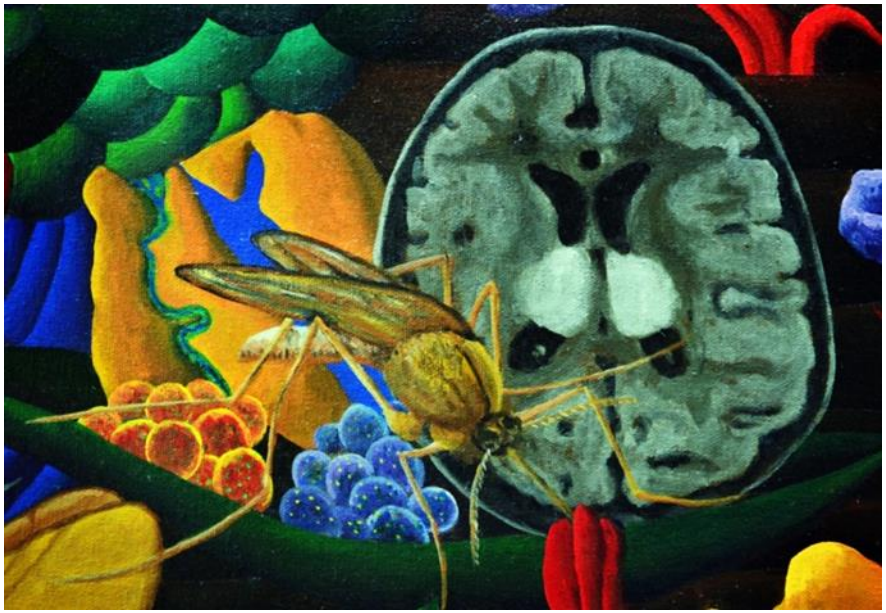
Arbovirozele în contextul migrației accelerate

Corneliu Petru Popescu[1,2]

1.Carol Davila University of Medicine and Pharmacy, Bucharest

2.Dr Victor Babes Clinical Hospital of Infectious and Tropical Diseases, Bucharest



Werner Horvath: **"Art meets Science: Tropical Diseases".** Oil and acrylic on canvas,140 x 100 cm, 2014. Exhibited in Kunsthaus Graz, Sept. 22nd, 2018 - Jan. 27th, 2019 and published in the Supplement of the Catalogue "Congo Stars", edited by Barbara Steiner and Günther Holler-Schuster, ISBN 978-3-903179-10-3, 2018.

- Arboviruses (**ar**thropod-**bo**rne) grouped based on common mode of transmission between vertebrates by bite of infected arthropod. (biological vs mechanical transmisison).

- Arthropods like midges, mosquitoes, sandflies and ticks.

Arboviruses **ar**thropod-**bo**rne viruses

- Systemic acute febrile illness typically accompanied by headache, arthralgia, and myalgia, with or without rash and/or polyarthritis;

- Hemorrhagic fever that might be extensive, and associated with capillary leakage, shock, jaundice, liver damage, and death;

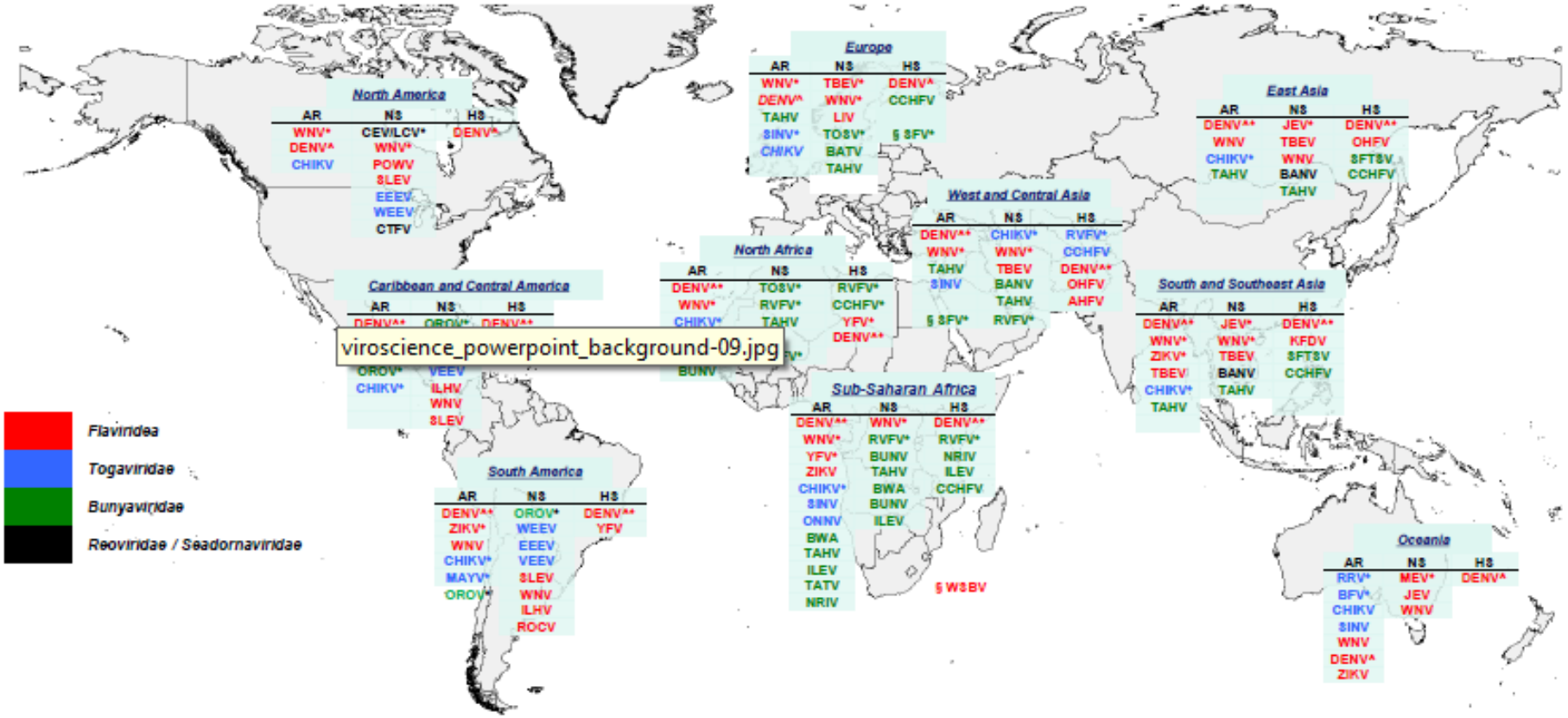
- **Acute central nervous system illness ranging from mild aseptic meningitis to encephalitis with coma, paralysis, and death.**

List of mosquito- and tick-borne flaviviruses (Genus *Flavivirus*)

Virus groups	Virus species	Virus strains/Subtypes	Abbr.	Geographic distribution	Animal disease
Mosquito-borne flaviviruses					
Japanese encephalitis virus group	Japanese encephalitis virus	Japanese encephalitis virus	JEV	Asia	Pigs, horses
	St. Louis encephalitis virus	St. Louis encephalitis virus	SLEV	Americas	Birds
	West Nile virus	West Nile virus	WNV	Worldwide	Reptiles, birds, mammals
	Murray Valley encephalitis virus	Murray Valley encephalitis virus	MVEV	Australia, Papua New Guinea	Young sheep and monkeys
		Alfuy virus	ALFV	Australia	Unknown
	Koutango virus	Koutango virus	KOUV	Senegal	Unknown
	Cacipacore virus	Cacipacore virus	CPCV	Brazil	Unknown
	Usutu virus	Usutu virus	USUV	Africa, Europe	Birds
		Kunjin virus	KUNV	Australia, Indonesia, Europe	Unknown
	Yaounde virus	Yaounde virus	YAOV	Central Africa	Unknown
Dengue virus group	Dengue virus	Dengue virus 1	DENV-1	Tropics, subtropics	Primates (sylvatic)
		Dengue virus 2	DENV-2	Tropics, subtropics	Primates (sylvatic)
		Dengue virus 3	DENV-3	Tropics, subtropics	Primates (sylvatic)
		Dengue virus 4	DENV-4	Tropics, subtropics	Primates (sylvatic)
Yellow fever virus group	Yellow fever virus	Yellow fever virus	YFV	Tropical Africa and South America	Primates
	Wesselsbron virus	Wesselsbron virus	WSLV	Africa, Madagascar, Thailand	Sheep, goat, cattle
	Sepik virus	Sepik virus	SEPV	New Guinea	Unknown
Aroa virus group	Aroa virus	Aroa virus	AROAV	Venezuela	Unknown
		Bussuquara virus	BSQV	Brazil, Colombia, Panama	Unknown
		Iguape virus	IGUV	Brazil	Unknown
		Naranjal virus	NJLV	Ecuador	Unknown
Kokobera virus group	Kokobera virus	Kokobera virus	KOKV	Australia, Papua New Guinea	Unknown
		Stratford virus	STRV	Australia	Unknown
Ntaya virus group	Bagaza virus	Bagaza virus	BAGV	Africa	Unknown
	Ilheus virus	Ilheus virus	ILHV	South and Central America	Unknown
		Rocio virus	ROCV	Brazil	Birds
	Israel turkey meningoencephalitis virus	Israel turkey meningoencephalitis virus	ITV	Israel, South Africa	Turkeys
	Ntaya virus	Ntaya virus	NTAV	Africa	Unknown
	Tembusu virus	Tembusu virus	TMUV	Malaysia, Thailand	Unknown
	Zika virus	Zika virus	ZIKV	Africa, Asia, Micronesia	Unknown
Possibly mosquito-borne flaviviruses					
Kedougou virus group	Kedougou virus	Kedougou virus	KEDV	Senegal, CAR	Unknown
Edge Hill virus group	Banzi virus	Banzi virus	BANV	South Africa	Unknown
	Bouboui virus	Bouboui virus	BOUV	Africa	Unknown
	Edge Hill virus	Edge Hill virus	EHV	Australia	Unknown
	Jugra virus	Jugra virus	JUGV	Malaysia	Unknown
	Saboya virus	Potiskum virus	POTV	Africa	Experimental fatal disease: chicken
		Saboya virus	SABV	Africa	Unknown
	Uganda S virus	Uganda S virus	UGSV	Africa	Unknown
Tick-borne flaviviruses					
Mammalian tick-borne virus group	Tick-borne encephalitis virus	European subtype	TBEV-Eur	Europe	Calves, lambs, goats
		Far Eastern subtype	TBEV-FE	Far East Russia, Northeast China, Northern Japan	Calves, lambs, goats
		Siberian subtype	TBEV-Sib	Finland, European part of Russia, Siberia	Calves, lambs, goats
	Powassan virus	Powassan virus	POWV	Russia, USA, Canada	Small mammals
	Louping ill virus	British subtype	LIV-Brit	British islands, Norway	Sheep, dogs, goat kids, horses, piglets, deer
		Irish subtype	LIV-Ir	British islands	Sheep
		Spanish subtype	LIV-Spain	Iberian Peninsula	Unknown
		Turkish sheep encephalitis virus subtype	TSEV	Turkey	Unknown
		Greek goat encephalitis virus subtype	GGEV	Greece	Goats
	Gadgets Gully virus	Gadgets Gully virus	GGYV	Australia	Unknown
	Kyasanur Forest disease virus	Kyasanur Forest disease virus	KFDV	India, Saudi Arabia	Primates, rodents, camels
		Alkhurma hemorrhagic fever virus	AHFV	Arabian Peninsula	Unknown
	Langat virus	Langat virus	LGTV	Malaysia, Thailand, Siberia	Unknown
	Omsk hemorrhagic fever virus	Omsk hemorrhagic fever virus	OHFV	Asia	Rodents, muskrats
	Royal Farm virus	Royal Farm virus	RFV	Afghanistan	Unknown
Seabird tick-borne virus group	Meaban virus	Meaban virus	MEAV	France (Britanny)	Unknown
	Saumarez Reef virus	Saumarez Reef virus	SREV	Australia	Unknown
	Tyuleniy virus	Tyuleniy virus	TYUV	Northern Russia, Norway, Western USA	Unknown
Possibly tick-borne flaviviruses					
Kadam virus group	Kadam virus	Kadam virus	KADV	East Africa, Arabian Peninsula	Unknown

Yun Young Go, Udeni B. R. Balasuriya, Chong-kyo Lee; Zoonotic encephalitides caused by arboviruses: Transmission and epidemiology of alphaviruses and flaviviruses Clin Exp Vaccine Res 2014;3:58-77

Many diseases display overlapping symptoms and geographical distribution
Within genus cross-reactivity!



§ Fever with general malaise/myalgia +

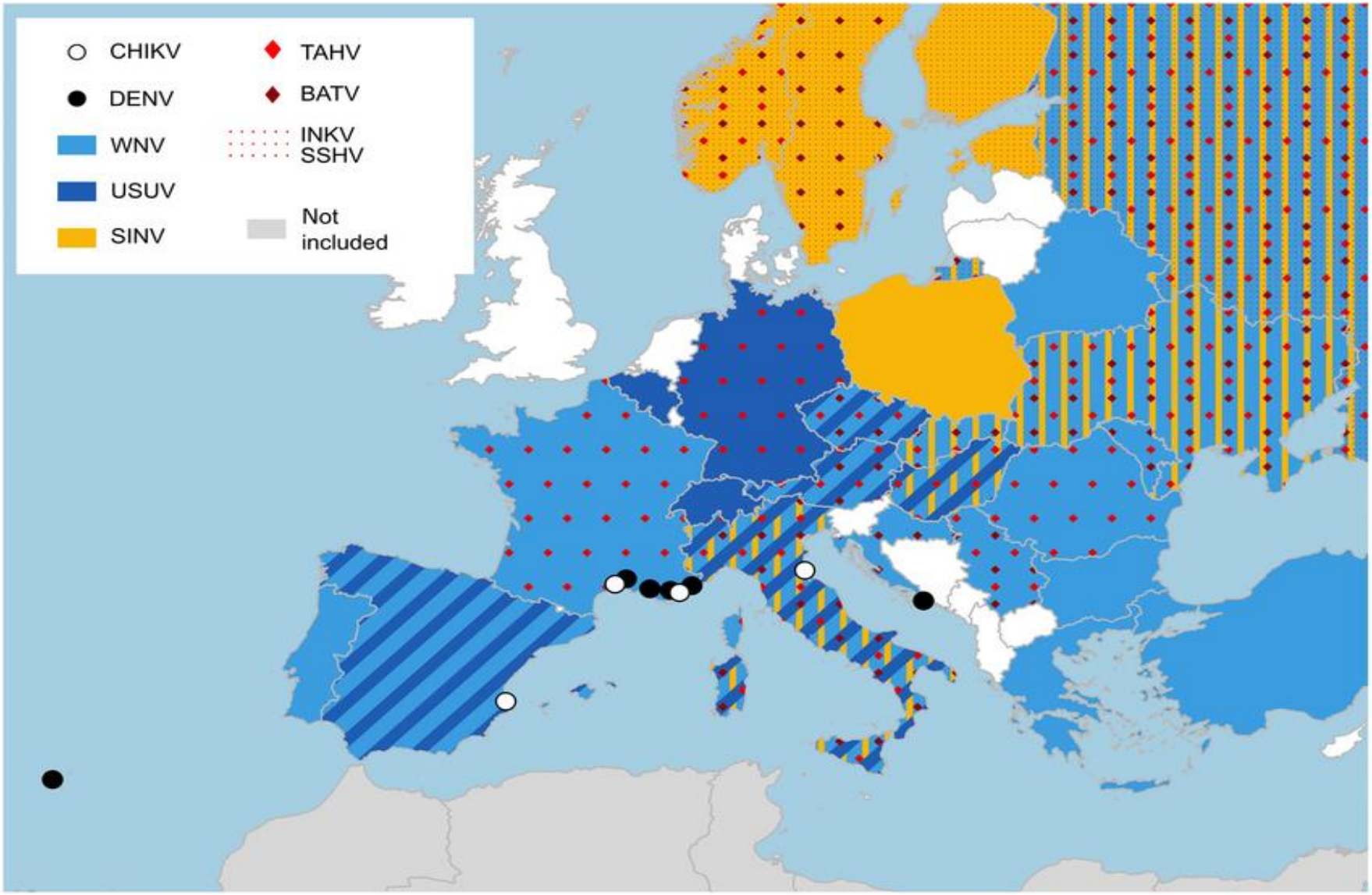
AR=Arthritis/arthralgia and rash
HS=Haemorrhagic symptoms
NS=neurological symptoms

Fig 1. Geographical distribution of medically important arboviruses that cause febrile disease in humans.
Cleton et al 2012 Journal of Clinical virology & Cleton et al 2015 PNTD

Family Genus	Virus	Transmission	Syndromes	European regions and risk(1)	Occurrence
Flavivirus **Flavivirus**	West Nile virus (WNV)	**Mosquito** Blood transfusion Organ transplant Vertical (rare) Breast-feeding (rare)	Febrile illness Rash Neurological syndrome	Southern, South-east and Central Europe (high risk)	Endemic
	Tick-borne encephalitis virus (TBEV)	**Ticks** Animal tissue(96) Blood transfusion(96) Breastfeeding(96)	Febrile illness Rash Neurological syndrome	Northern, Central and Eastern Europe (high risk)	Endemic
	Dengue virus (DENV)	**Mosquito** Anthroponotic* Blood transfusion Transplant Vertical(97) Breast milk(97)	Febrile illness Rash and/or arthralgia Haemorrhagic syndrome Neurological syndrome	Madeira and Southern Europe (low risk)	Sporadic, localised outbreaks**
Bunyaviridae **Nairovirus**	Crimean-Congo Haemorrhagic fever (CCHFV)	**Tick** Animal- & human-fluids Nosocomial	Febrile illness Rash and/or arthralgia Haemorrhagic syndrome	South-east and Eastern Europe (low risk)	Endemic
Bunyaviridae **Phlebovirus**	Toscana virus (TOSV)	**Sandfly**	Febrile illness Rash Neurological syndrome	Southern and South-east Europe (high risk)	Endemic
Togaviridae **Alphavirus**	Chikungunya virus (CHIKV)	**Mosquito** Anthroponotic(98) Vertical(98)	Febrile illness Arthralgia	Southern Europe (low risk)	Sporadic, localised outbreaks**
	Sindbis virus (SINV)	**Mosquito**	Rash and arthralgia	Northern Europe	Endemic

Sigfrid, Louise & Reusken, Chantal & Eckerle, Isabella & Nussenblatt, Veronique & Lipworth, Sam & Messina, Janey & Kraemer, Moritz & Ergonul, Onder & Papa, Anna & Koopmans, Marion & Horby, Peter. (2017). Preparing clinicians for (re-) emerging arbovirus infectious diseases in Europe. Clinical Microbiology and Infection. 24. 10.1016/j.cmi.2017.05.029.

Calzolari, Mattia. (2016). Mosquito-borne diseases in Europe: An emerging public health threat. Reports in Parasitology. 5. 1. 10.2147/RIP.S56780.



Abbreviations: CHiKv, Chikungunya virus; DeNv, Dengue virus; wNv, west Nile virus; USUv, Usutu virus; SiNv, Sindbis virus; TAHv, Tahyna virus; BATv, Batai virus; iNKv, inkoo virus; SSHv, Snowshoe Hare virus.


I'm hungry!
Where the hell are all the people?
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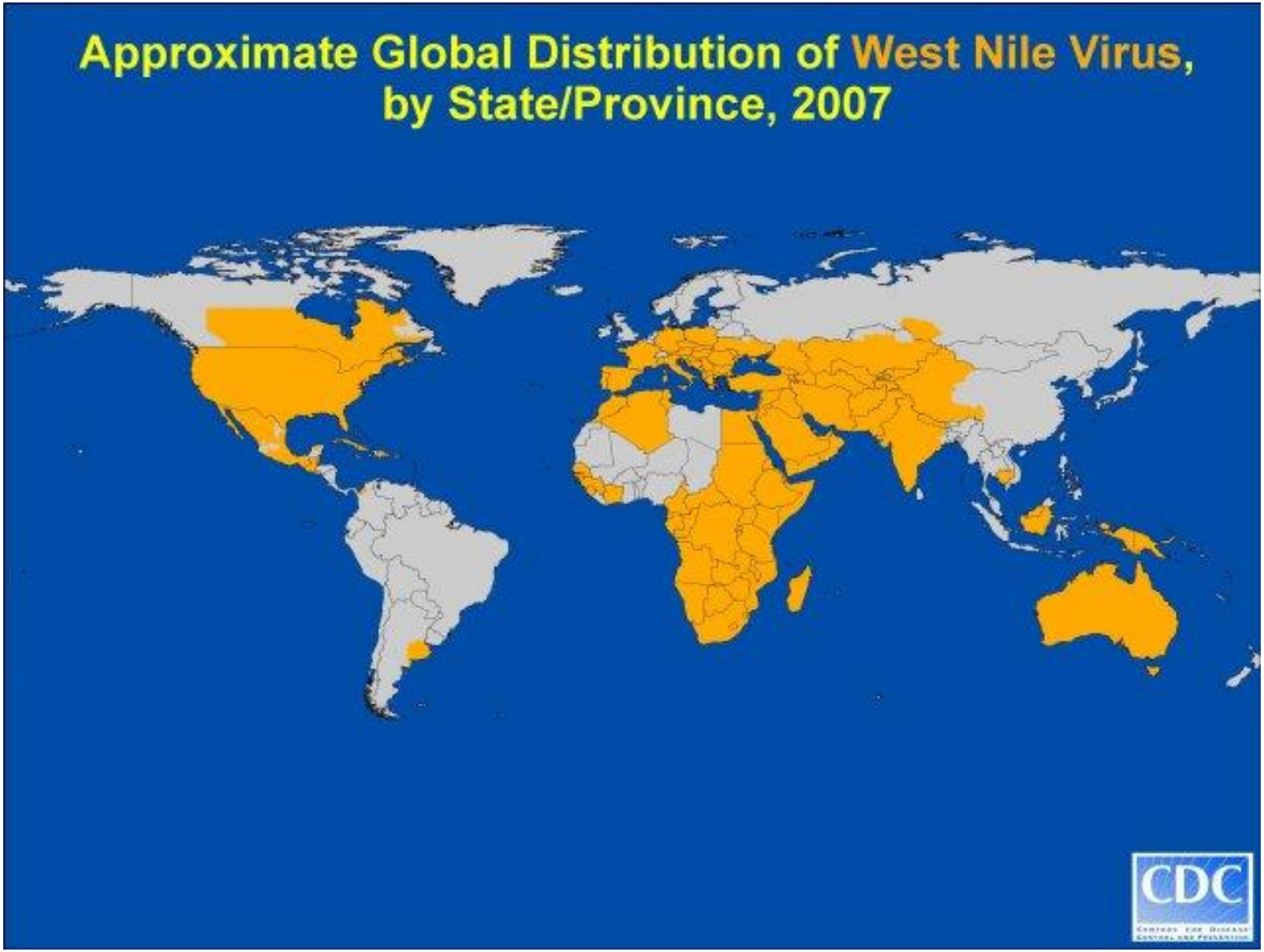
Worldwide distribution



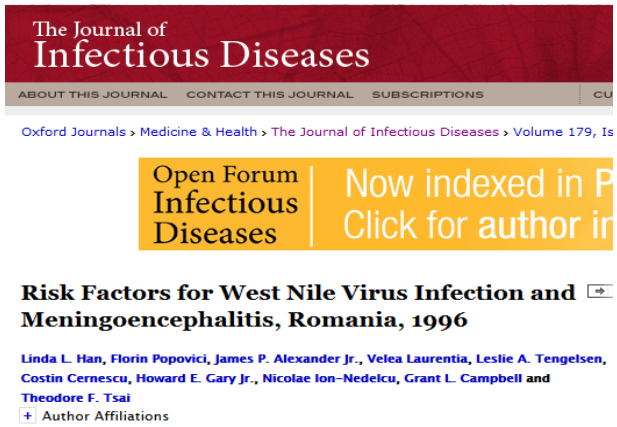
Lineages

- Lineage 1 is divided into 3 clades (1a, 1b, and 1c) and contains both virulent and attenuated viruses.

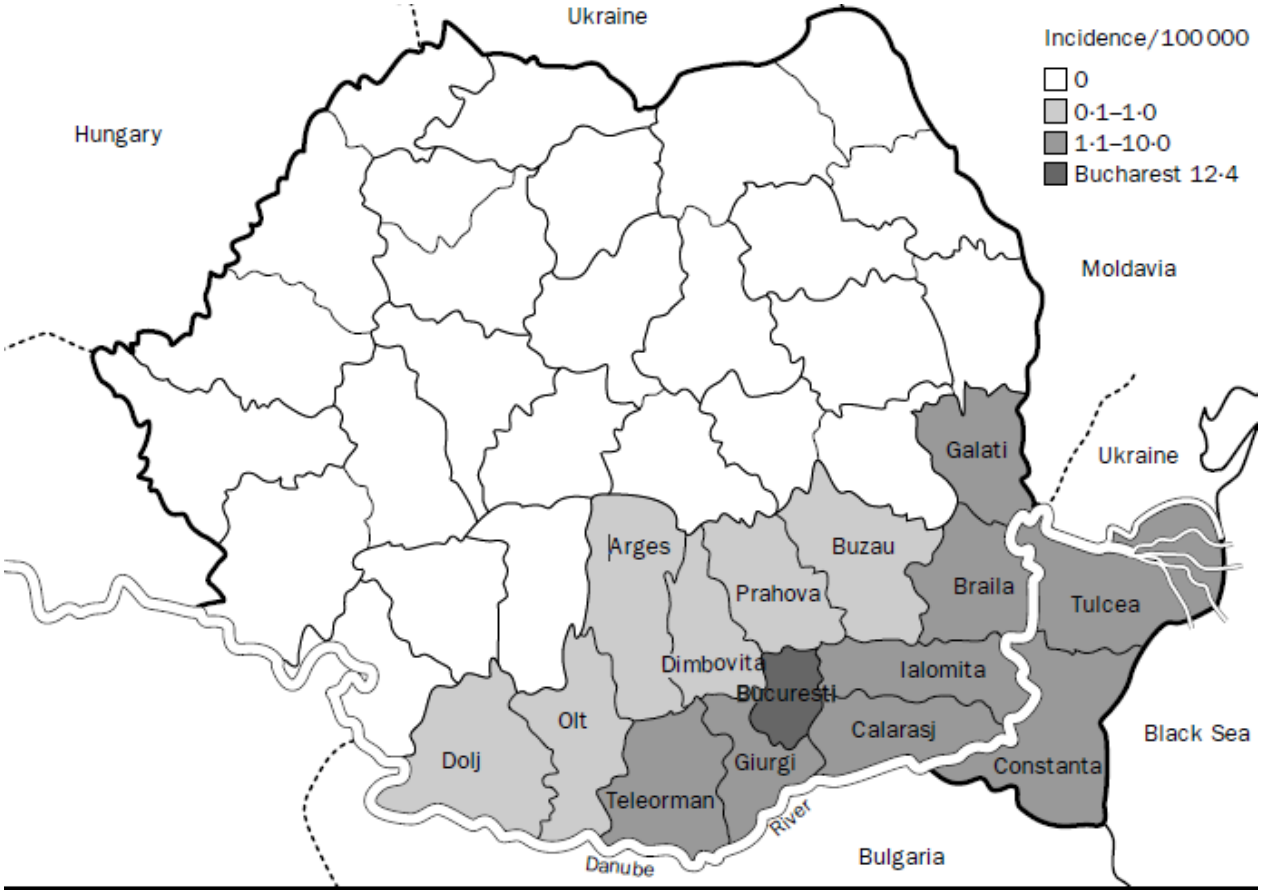
- Clade 1a is responsible for many recent outbreaks.
- Clade 1b consists of Kunjin viruses, which are found in Australia
- Clade 1c viruses found in India.

- Lineage 2 viruses, found mainly in sub-Saharan Africa and Madagascar, often cause asymptomatic infections or mild disease, but Hungary (2004, birds), Austria (2008, birds), Russia (2007), Greece (2010), Romania (2010), Italy (2011), Serbia (2012) and Croatia (2012).

Tsai T. F, Popovici F, Cernescu C, Campbell G. L, and Nedelcu N. I, "West Nile encephalitis epidemic in southeastern Romania," The Lancet, 1998; vol. 352, no. 9130, pp. 767–771.



Increased exposure to the mosquito vector, particularly in the home and its immediate environs, was associated with risk of acquiring WNV infection



1996: 393 cases (WNV lineage I, strain RO970-50)

Fatality rate: 4.8%

- 15% encephalitis
- 1.8% meningitis

Culex pipiens mosquitoes

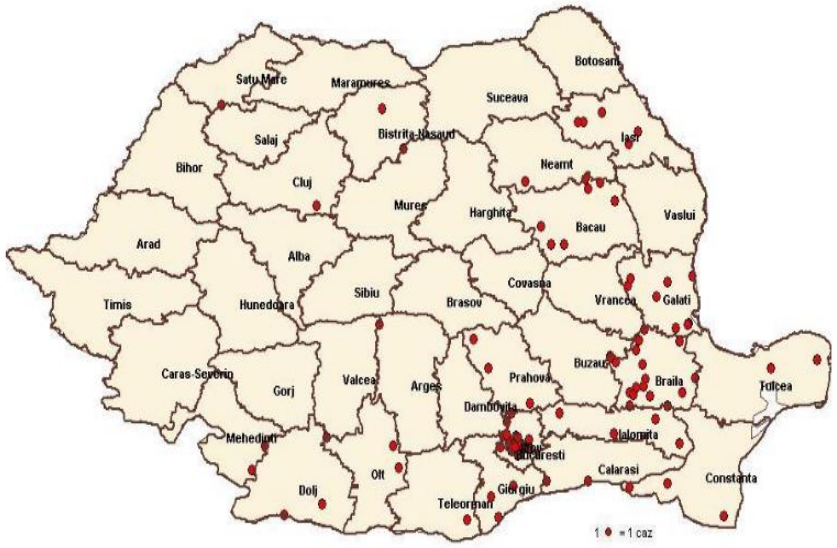
Rom J Virol. 1997 Jan-Dec;48(1-4):3-11.

Clinical manifestations in the West Nile virus outbreak.

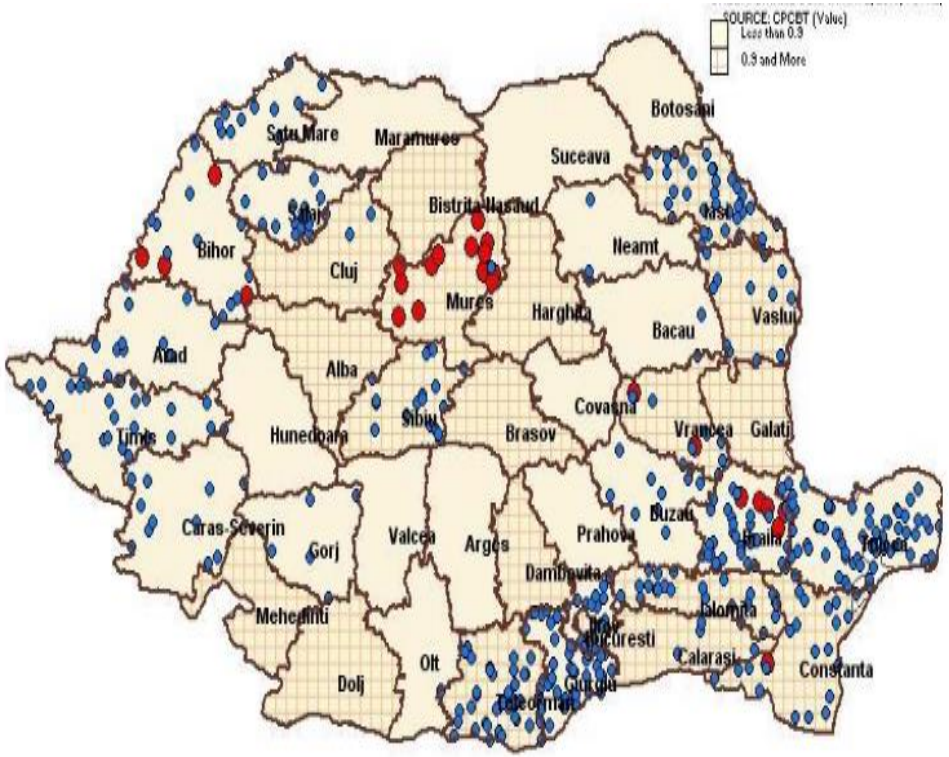
Ceauşu E[1], Erşcoiu S, Calistru P, Ispas D, Dorobăţ O, Homoş M, Bărbulescu C, Cojocaru I, Simion CV, Cristea C, Oprea C, Dumitrescu C, Duiculescu D, Marcu I, Mociorniţă C, Stoicev T, Zolotuşca I, Calomfirescu C, Rusu R, Hodrea R, Geamai S, Păun L.

1996 – 2009 (78 cases)

2016 (93 cases)



2010 Humans (57 cases) and horses

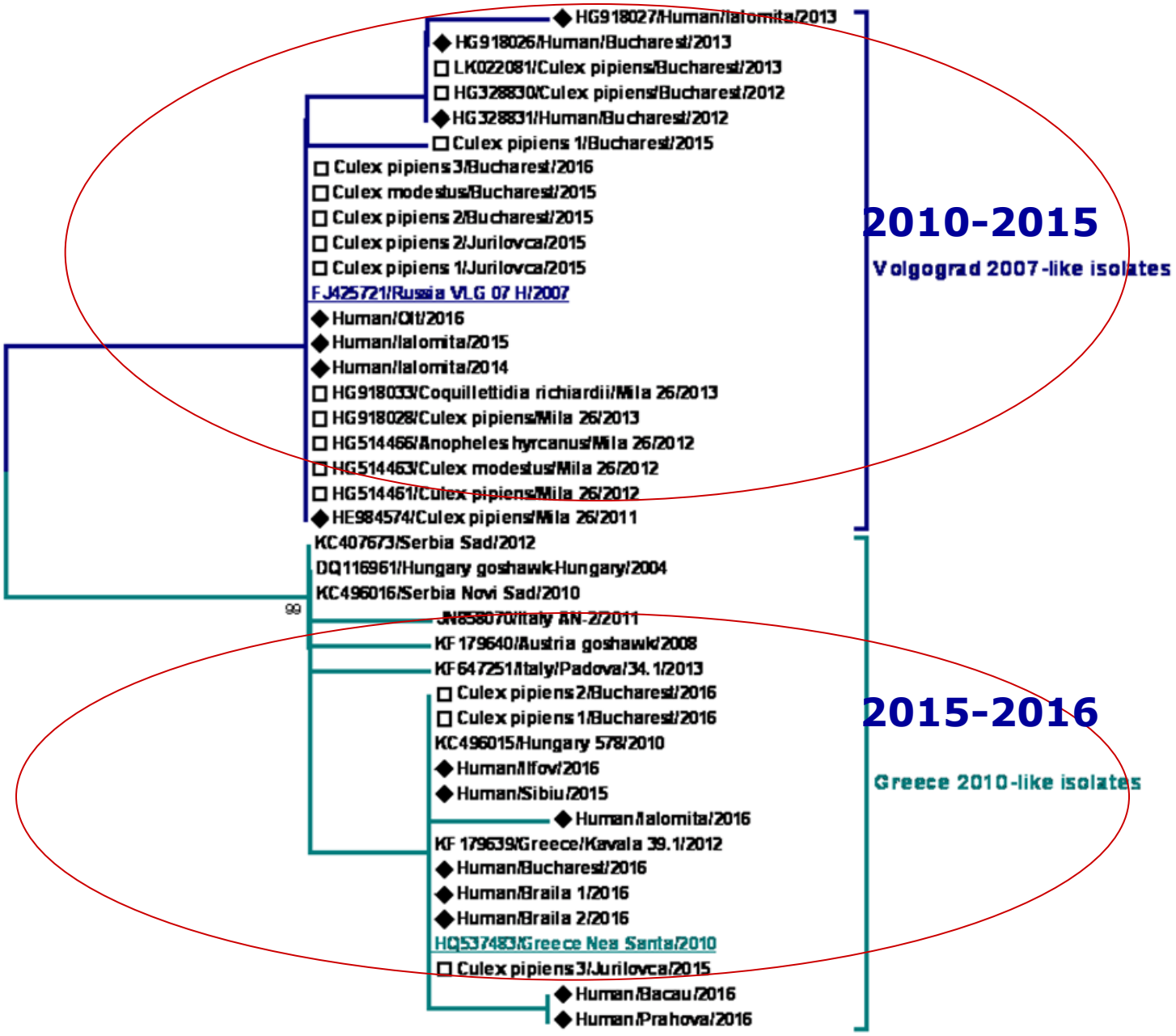


National Centre for Surveillance and Control of Communicable Diseases

2015: Co-circulation of two lineage 2 WNV strain

Samples	Site /county	WNV strain (NS5 and E partial sequences)	No of positive samples/date
Mosquitoes	Danube Delta Reserve	~ Volgograd 2007	3 (Aug 6 - 29)
		~ Nea-Santa 2010	1 (Aug 28)
	Bucharest city	~ Volgograd 2007	3 (Jul 9 - Aug 19)
		~ Nea-Santa 2010	1 (Aug 20)
Humans	Ialomita county	~ Volgograd 2007	1 (Sept 23)
	Buzau county	~ Nea-Santa 2010	1 (Sept 11)
	Sibiu county	~ Nea-Santa 2010	1 (Sept 18)

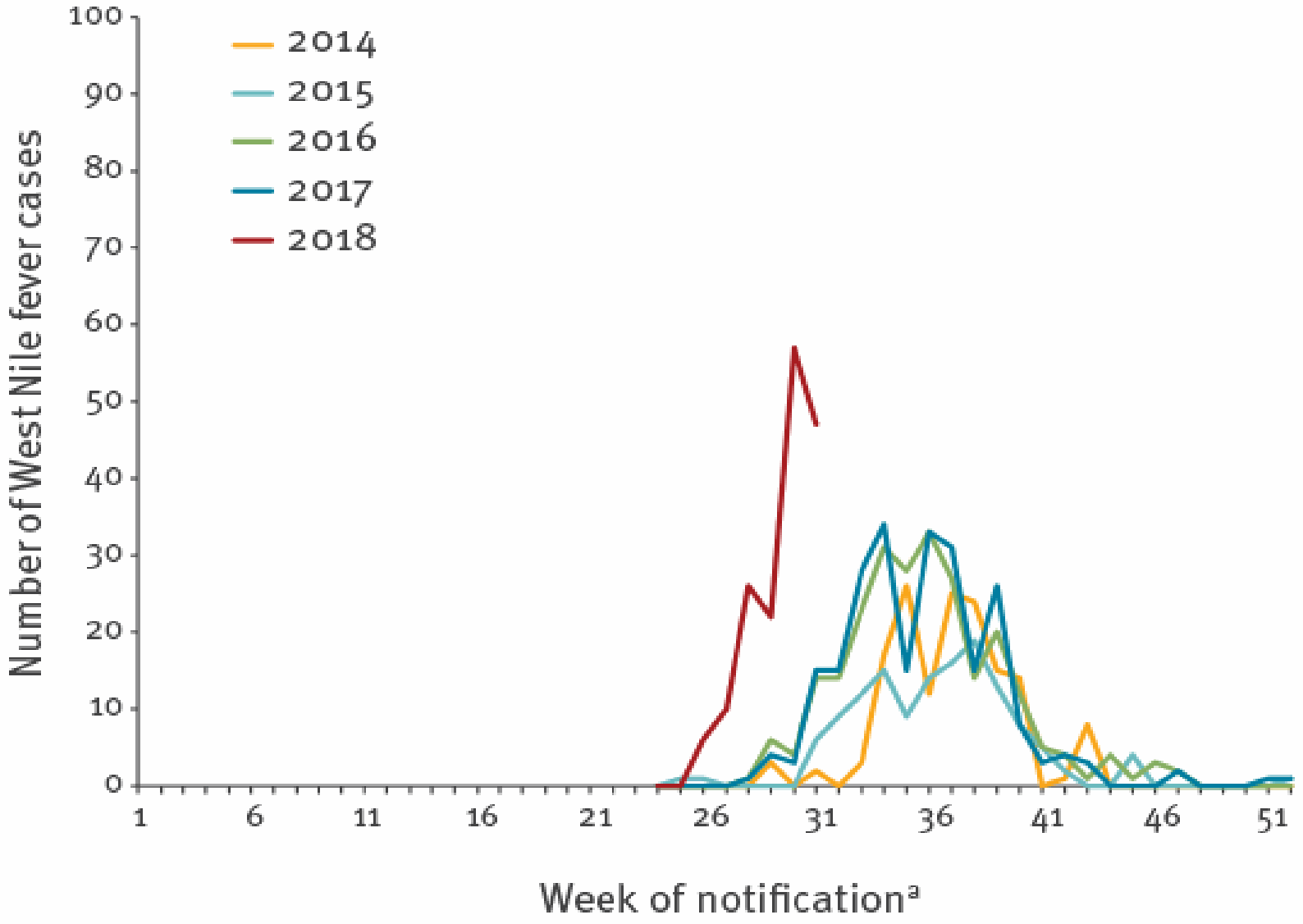
Molecular epidemiology of West Nile virus circulating in Romania in 2010-2015



Mortality rates associated with West Nile virus neuroinvasive disease, Europe and USA

Country/year/reference	No of WNVND	Deaths	Mortality rates
Romania 1996, Tsai et al., 1998	352	17	**4.8**
USA 1999, ArboNET	59	7	12
Israel 2000, Chowers et al., 2001	173	33	**19.1**
USA 2001, ArboNET	64	10	**16**
USA 2002, ArboNET	2946	232	8
Israel 2005-2012, Anis et al., 2014	465	31	6.7
Italy 2008-2011, Rizzo et al., 2012	43	7	**16**
Greece 2010, Papa et al., 2010; Danis et al., 2011	197	33	**17**
Romania 2010, Sirbu et al., 2011	49	5	**10.2**
Turkey 2010, Kalaycioglu et al., 2012	47	10	21
Greece 2011, Danis et al., 2011	31	1	3.2
Greece 2012, Pervanidou et al., 2014	109	18	**16.5**
Serbia 2012, Popovic et al, 2013	58	9	**15.5**
Italy 2008-2015, Rizzo et al, 2016	173	18	10
Italy 2012-2015, Rizzo et al., 2016	140	11	7.9
USA 2014, ArboNET	1347	87	6
USA 2016, ArboNET	1309	105	8
Romania 2016, NCSCCD	93	19	**20.4**
Romania 2017, NCSCCD	66	14	**21.2**

CP Popescu, SA Florescu, AI Cotar, D Badescu et al. Re-emergence of severe West Nile virus neuroinvasive disease in humans in Romania, 2012 to 2017–implications for travel medicine - Travel Medicine and Infectious Disease, 2018



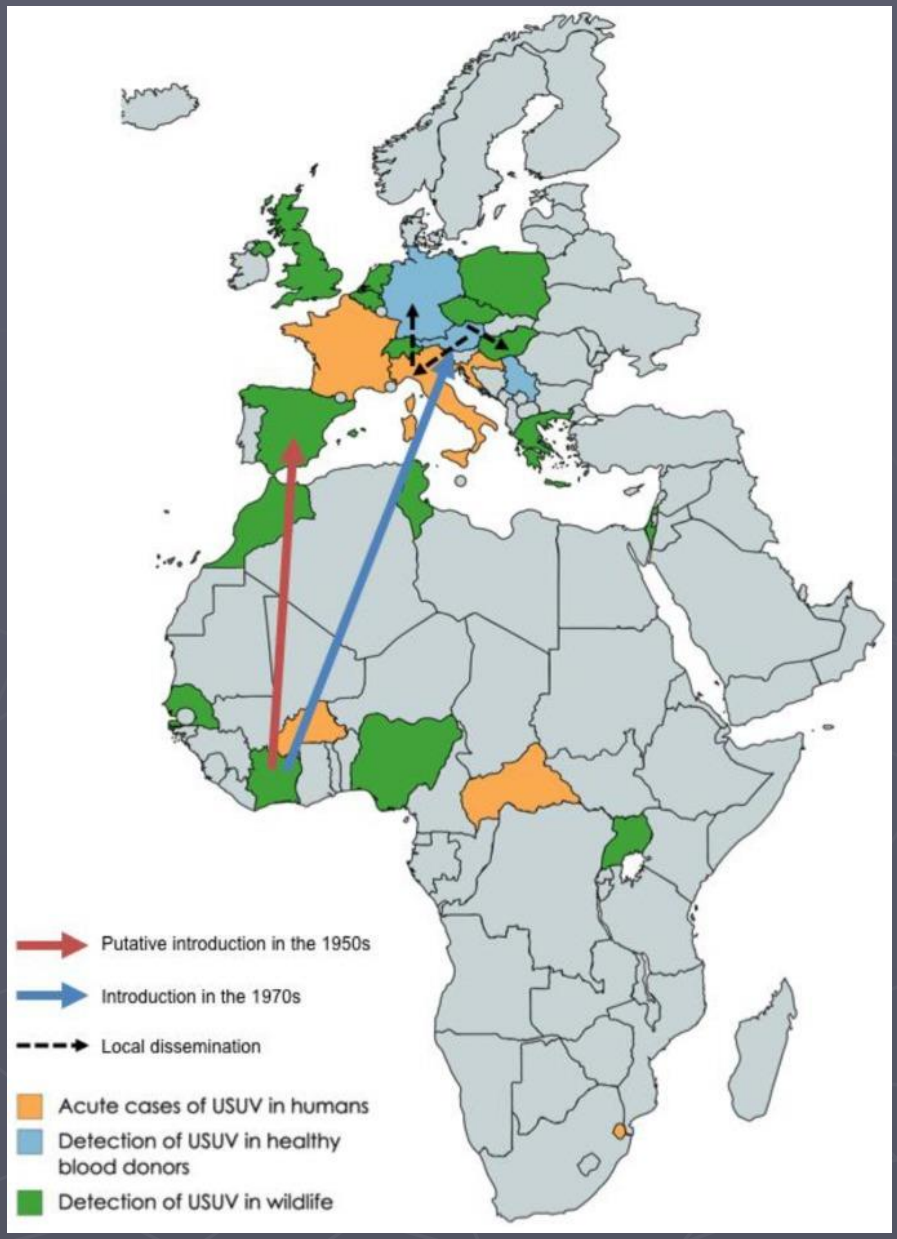
Haussig Joana M., Young Johanna J., Gossner Céline M., Mezei Eszter, Bella Antonino, Sirbu Anca, Pervanidou Danai, Drakulovic Mitra B., Sudre Bertrand. Early start of the West Nile fever transmission season 2018 in Europe. Euro Surveill. 2018;23(32):pii=1800428.

Usutu virus

The first detection in Europe was in 2001 during a severe bird die-off (mainly Eurasian blackbirds) in Austria
Retrospectively in archived tissue samples from bird deaths in 1996 in the Tuscany region of Italy (Papa, A. (2019). *Emerging arboviruses of medical importance in the Mediterranean region. Journal of Clinical Virology)*

Competent vector: mainly *Culex spp*

Birds reservoir: 93 different species belonging to 35 families - blackbirds (*Turdus merula*), gray owls (*Strix nebulosa*), and house sparrows (*Passer domesticus*)



Roesch F, Fajardo A, Moratorio G, Vignuzzi M. Usutu Virus: An Arbovirus on the Rise. Viruses. 2019 Jul 12;11(7):640. doi: 10.3390/v11070640. PMID: 31336826; PMCID: PMC6669749.

Le virus Usutu : la menace fantôme

Marion Clé, Sara Salinas, Sylvie Lecollinet, Cécile Beck, Serafin Gutierrez, Thierry Baldet, Philippe Vande Perre, Vincent Foulongne and Yannick Simonin Med Sci (Paris), 34 8-9 (2018) 709-716

Infections aiguës (n = 28)

Pays	Année	Nombre	Échantillon	Clinique	Population étudiée	Méthode diagnostique	Réf
RCA	1981	1	Sang	Fièvre éruptive	Cas clinique	Culture	[15]
Burkina	2004	1	Sang	Ictère fébrile	Cas clinique	Culture	[15]
Italie	2009	1	LCR	Méningo-encéphalite	Cas clinique	RT-PCR panflavi + séquence	[36]
	2009	1	Sang	Encéphalite	Cas clinique	Procleix-WNV et RT-PCR panflavi[1] + séquence	[37]
	2008-9	Mar-44	LCR	Méningo-encéphalite	Patients avec méningo-encéphalites	RT-PCR spécifique	[38]
	2008-11	8/306 + 2/609	LCR + sang	Méningo-encéphalite/Sain	Patients avec méningo-encéphalites (LCR) + Patients divers (sérum)	RT-PCR spécifique et séroneutralisation	[39]
Croatie	2013	Mar-95	Sang	Méningo-encéphalite	Patients avec méningo-encéphalites	ELISA et séroneutralisation	[40]
Allemagne	2016	1	Sang	Sain	Donneurs de sang (n ?)	Cobas WNV[2] + séquence	[41]
France	2016	1/666	LCR	Paralysie *a frigore*	Patients avec signes infectieux et/ou neurologiques	RT-PCR panflavi +séquence	[43]
Autriche	2017	6/12047	Sang	Sain	Donneurs de sang	Cobas WNV + séquence	[42]

Séroprévalence (n=74)

Pays	Année	Nombre	Prévalence	Population étudiée	Méthode diagnostique	Réf
Italie	2009	4/359	1,1 %	Donneurs de sang	ELISA et séroneutralisation	[44]
	2008-11	40/609	6,5 %	Patients sains et avec pathologies diverses	Séroneutralisation	[39]
	2010-11	14/6 000	0,23 %	Donneurs de sang	ELISA et séroneutralisation	[46]
	2014-15	2/200	1 %	Donneurs de sang	Séroneutralisation	[47]
	2014-15	Jun-33	18,1 %	Forestiers à risques d'exposition	Séroneutralisation	[47]
Serbie	2015	Jul-93	7,5 %	Patients sains avec risques d'exposition	ELISA et séroneutralisation	[48]
Allemagne	2012	1/4 200	0,02 %	Donneurs de sang	ELISA, immunofluorescence et séroneutralisation	[45]

pathogens

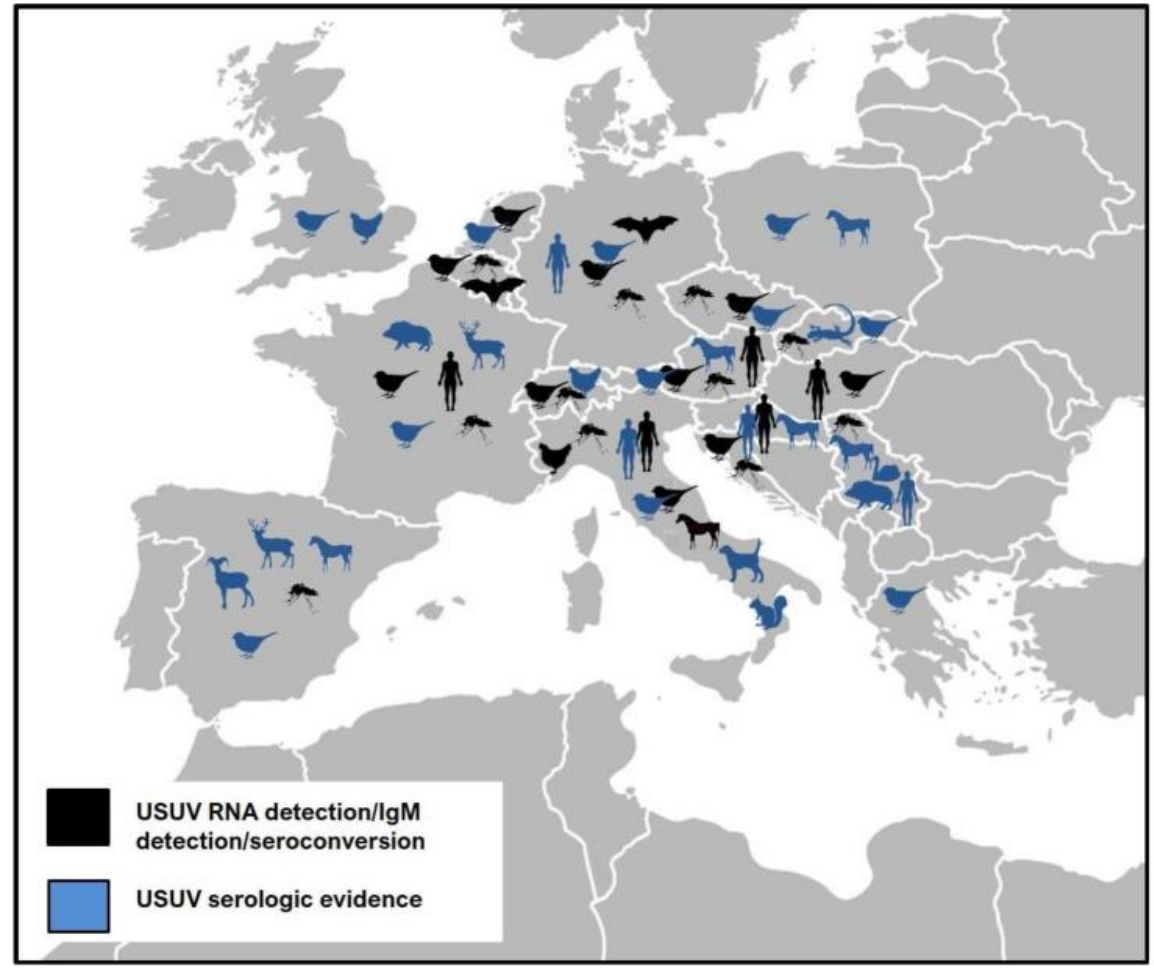
MDPI

Pathogens. 2020 Sep; 9(9): 699.
Published online 2020 Aug 26. doi: 10.3390/pathogens9090699

PMCID: PMC7560012
PMID: 32858963

Epidemiology of Usutu Virus: The European Scenario

Tatjana Vilibic-Cavlek,[1,2,*] Tamas Petrovic,[3] Vladimir Savic,[4] Ljubo Barbic,[5] Irena Tabain,[1] Vladimir Stevanovic,[5] Ana Klobucar,[6] Anna Mrzljak,[2,7] Maja Ilic,[8] Maja Bogdanic,[1] Iva Benvin,[5] Marija Santini,[9] Krunoslav Capak,[10] Federica Monaco,[11] Eddy Listes,[12] and Giovanni Savini[11]



WNV and USUV

- Same areas, reservoir and vectors
- Antibody cross-reactivity
- Cross-protection or antibody enhancement of infection?
- 2018 unprecedented extent of USUV circulation and WNV reached historically high levels in Europe (2083 cases)

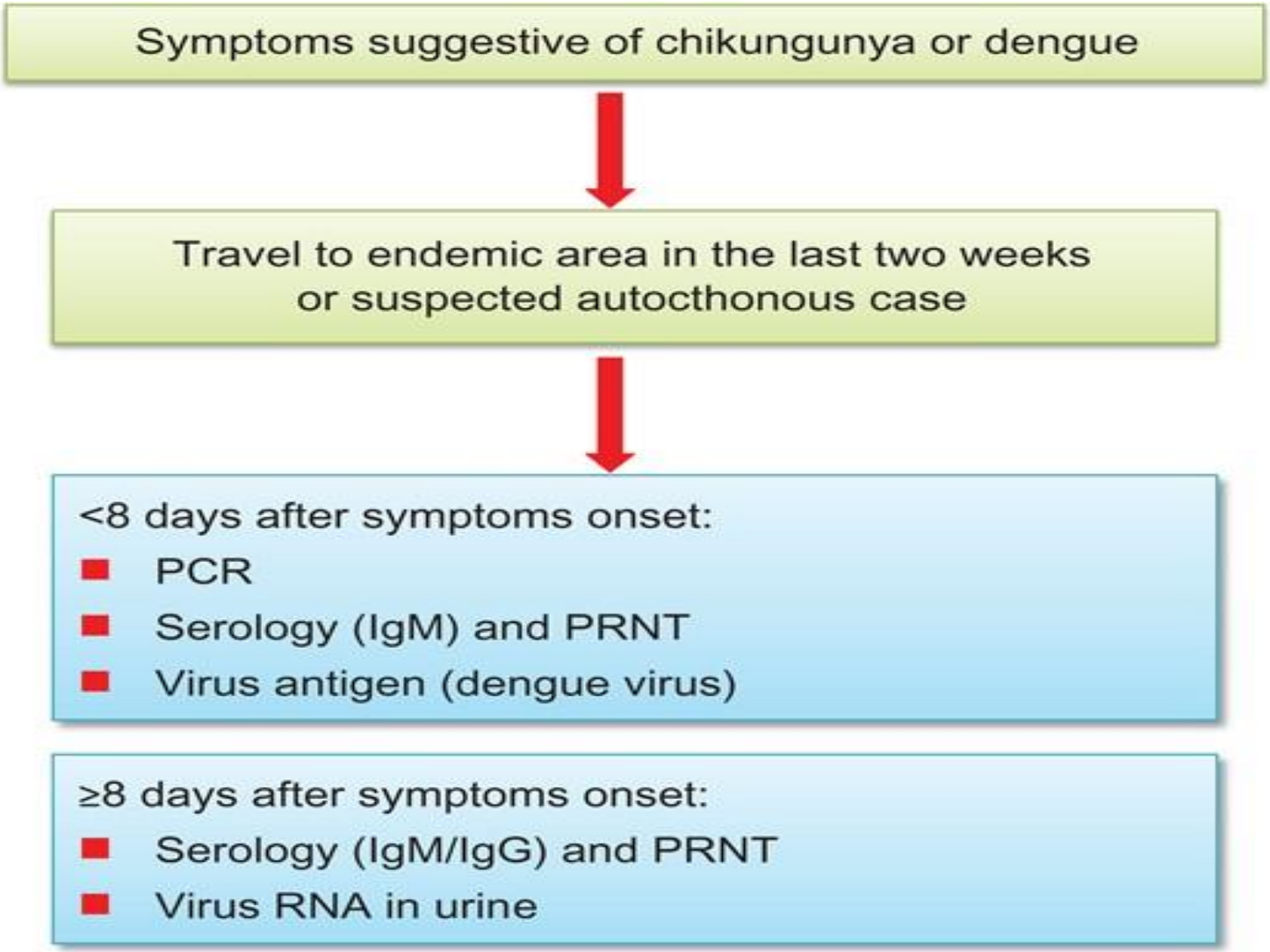
Caz clinic

- 11 ani, sex feminin
- 09.01.2019 - febra, frison
- 10.01.2019 – exantem la nivelul membrelor, greata, varsaturi, artralgii usoare

- 14 ani, sex feminin
- 12.01.2019 - febra, frison, artralgii in special la nivelul mainilor
- 17.01.2019 – exantem la nivelul membrelor

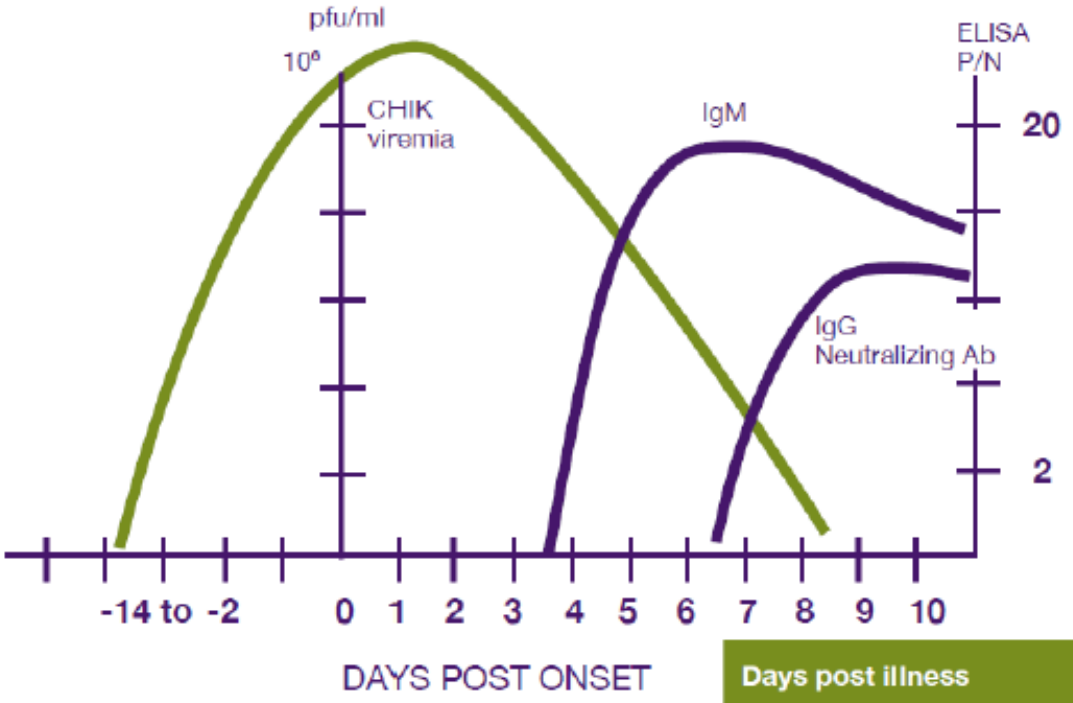
Thailanda, 3-13.01.2019

Chikungunya and Dengue virus



J Travel Med, Volume 25, Issue 1, 2018, tay004, https://doi.org/10.1093/jtm/tay004

Viremia and immune response following CHIKV infection



Days post illness onset	Virus testing	Antibody testing
Day 1-3	RT-PCR = Positive Isolation = Positive	IgM = Negative PRNT = Negative
Day 4-8	RT-PCR = Positive Isolation = Negative	IgM = Positive PRNT = Negative
>Day 8	RT-PCR = Negative Isolation = Negative	IgM = Positive PRNT = Positive

PAHO/CDC

CHIKV vs. DENV

Comparison of clinical features of CHIKV and DENV infections

Joint pain and stiffness are more common with chikungunya than with dengue.

Clinical Features	Chikungunya Virus (CHIKV)	Dengue Virus (DENV)	Reference
1) Fever, asthenia	Common	Common	[6,8]
2) Myalgia	Possible	Very common	[6]
3) Polyarthritis	Very Common, edematous	None	[56]
4) Tenosynovitis	Yes	None	[57]
5) Leukopenia	None	Yes	[58]
6) Thrombocytopaenia	None	Yes	[59]
7) Rash	Days 1–4, important skin edema	Days 3–7	[6,35,58]
8) Retro-orbital pain	Rare	Common	[60]
9) Hypotension	Possible	Common, Days 5–7	[60,61]
10) Minor bleeding	Chronic polyarthritis up to 1 year	Common	[17,56]
11) Second stage	Possible; Tenosynvovitis at M2–M3 Raynaud's syndrome at M2–M3	Fatigue up to 3 mo	[6,56,57,58,62,63]

doi:10.1371/journal.pntd.0000623.t001

EPIDEMIOLOGY

CHIKV infection has been identified in over 60 countries in Africa, Asia, Europe and the Americas (since 2013/2014).

2005-2006,major outbreak n the Indian Ocean.
2007, outbreak of autochthonous CHIKV infections for the first time in Europe (Italy 217 laboratory-confirmed cases).
2010 and 2014, autochthonous cases in France (two and 11 cases).
December 2013, emergence of CHIKV - Asian genotype in the Caribbean (Saint Martin and the French West Indies) and quickly spread in the Americas.
During **2017**, autochthonous CHIK cases in France and Italy.

Figure 2. Map of Italy with circles indicating the places where outbreaks of chikungunya occurred in 2007 ...

2007
- more than 200 cases
- 10% of the population had been exposed to CHIKV

By the end of October 2017, 269 cases of chikungunya had been reported to the national authorities in the area surrounding Anzio, 61 cases in Roma

J Travel Med, Volume 25, Issue 1, 2018, tay004, https://doi.org/10.1093/jtm/tay004

Why?

A single aminoacid substitution may have influenced vector specificity

Increasing the fitness of CHIKV for specific vector species and consequently CHIKV transmission.

A genotype variant presenting a substitution of the aminoacid alanine with valine in the position 226 of the E1 protein (one of the two major envelope surface glycoproteins) of CHIKV (A226V), allowing an efficient replication and dissemination of the A226V variant of CHIKV.

	Location	Notes
1784, 1788, 1793	Cadiz, Seville (Spain)[5,10]	End of first pandemic, 1779–84
1861	Cyprus[11]	..
1863, 1867	Cadiz (Spain), then Jerez, Seville, and other places in Andalusia[10,11]	Imported from the West Indies by troops
1865	Canary Islands (Spain)[10]	..
1881	Crete (Greece)[11–13]	Half of the inhabitants affected
1887	Gibraltar[10]	Fifth pandemic, 1887–89
1888–1889	Cyprus[10]	..
1889	Athens, Piraeus, Salonica (Greece),[13,14] Greek Islands (Rhodes, Chios, and others), southern Turkey,[10,13,16] Izmir,[15] Manisa to Istanbul, Trabizon (Turkey), Varna* (Bulgaria), Lisbon (Portugal), Israel[10,13,16]	Around 80 000 cases in Izmir (80% of the inhabitants)
1889–1890	Istanbul, Izmir (Turkey), Napoli (Italy)[5,13,17]	
1895–1897	Athens (Greece)[14]	
1899	Antalya (Turkey)[11]	
1910	Athens, Piraeus (Greece)[12,16,18]	
1912	Israel[19]	
1913	Cyprus[11]	
1916	Dardanelles, Trabizon (Turkey)[11,20]	
1921	Vienna* (Austria)[21]	
1927	Malta[16]	..
1927–1928	Piraeus, Athens, Euboea, Gulf of Aegina (Greece), Izmir to south of Rhodes (Turkey)[10,13,21], Israel[16], Greece: DEN-1 and DEN-2 confirmed by retrospective serological study[22,23]	More than 1 million of people affected (90% of the population in Athens); 1000–1500 deaths
1928	Cyprus, Andalusia[24,25]	..
1929	Izmir[25]	..
1929–1933	Greece[22,26]	Confirmed by retrospective serological study
1945	Turkey, Israel (and other Middle East countries)[27]	..
2010	Croatia;[3,5] three DEN-1 clinical cases (including one reported in Germany) plus 15 recent infections	Virus probably introduced from Indian subcontinent
2010, 2013	France;[4,6] DEN-1 cases (2010), one DEN-2 case (2013)	Viruses probably introduced from West Indies
2012–13	Madeira;[28,28] more than 2200 DEN-1 cases from October, 2012, to January, 2013, plus 74 cases reported from Portugal mainland[8] and 12 other European countries	Virus probably introduced from Venezuela[29]

DEN-1=dengue virus serotype 1. DEN-2=dengue virus serotype 2. *Not clear whether data refer to a dengue outbreak or imported cases only, as there is no indication for the presence of *A aegypti* in Varna and Vienna.

Table: Historical and contemporary outbreaks of dengue in the WHO European region

- 1927-1928: Greece
- 2010: Southern France
- 2010: Croatia
- 2012/2013: Madeira

➔ Concern amongst public health officials about a potential resurgence and spread of dengue in Europe

Sources:
Reiter, Yellow fever and dengue: a threat to Europe? Eurosurveillance 2010 15(10):19509.
La Ruche et al. First two autochthonous dengue virus infections in metropolitan France, September 2010. Euro Surveill. 2010
Schmidt-Chanasit J, et al. Dengue virus infection in a traveller returning from Croatia to Germany. Euro Surveill. 2010

Preliminary report of an autochthonous chikungunya outbreak in France, July to September 2017

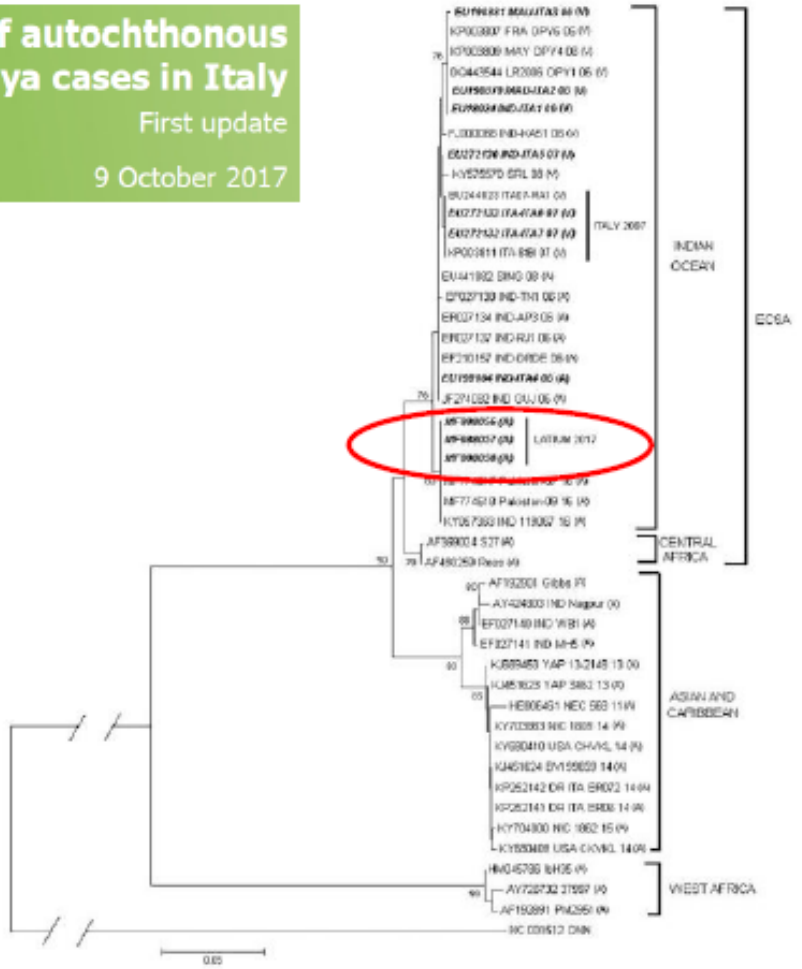
Clémentine Calba[1], Mathilde Guerbois-Galla[1,2], Florian Franke[1], Charles Jeannin[4], Michelle Auzet-Caillaud[5], Gilda Grard[1,2], Lucette Pigaglio[5], Anne Decoppet[5], Joel Weicherding[5], Marie-Christine Savaill[6], Manuel Munoz-Riviero[6], Pascal Chaud[1], Bernard Cadiou[7], Lauriane Ramalli[1,8], Pierre Fournier[9], Harold Noël[10], Xavier De Lamballerie[3], Marie-Claire Paty[10], Isabelle Leparc-Goffart[1,2]

France. By mid-September 2017, 9 autochthonous cases.
Genomic characterization identified an ECSA lineage strain, probably from the Central African region and carrying the A226V mutation facilitating transmission by *Ae. albopictus*.

Clusters of autochthonous chikungunya cases in Italy

First update

9 October 2017



2017

298 reported cases in Italy.

242 cases in Lazio (148 confirmed)

33 in Calabria (5 confirmed)

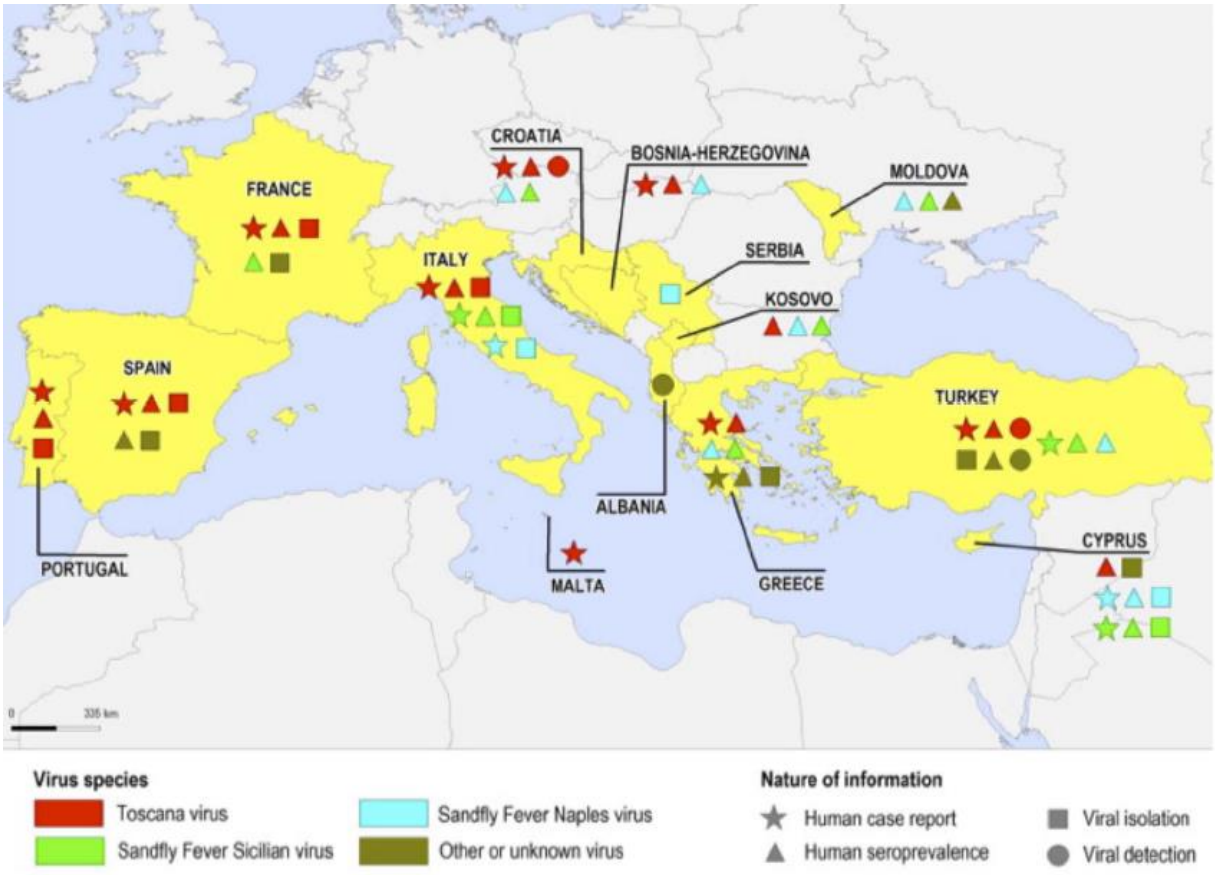
5 cases epidemiologically linked to Lazio in other Italian regions.

The virus belongs to the ECSA lineage and lacks the A226V mutation reported to increase replication in *A. albopictus*.

Toscana virus

Phlebotomus papatasi sandfly taking a blood meal (Centres for Disease Control and Prevention Public Health Image Library)

TOSV is the only sand fly–transmitted virus causing neuroinvasive disease in humans and the most prevalent arthropodborne virus in the Mediterranean area



Osborne JC, et al. Pract Neurol 2015;0:1–3. doi:10.1136/practneurol-2015-001265

EMERGING INFECTIOUS DISEASES®

EID Journal > Volume 27 > Number 5—May 2021 > Main Article

Volume 27, Number 5—May 2021

Dispatch

Emergence of Toscana Virus, Romania, 2017–2018

Corneliu P. Popescu[1]✉, Ani I. Cotar[1], Sorin Dinu, Mihaela Zaharia, Gratiela Tardei, Emanoil Ceausu, Daniela Badescu, Simona Ruta, Cornelia S. Ceianu, and Simin A. Florescu

8 cases (5 deaths) of CNS infections with TOSV, all in elderly patients, 7 of whom were residents of the city of Bucharest and 1 of the surrounding county (Ilfov)

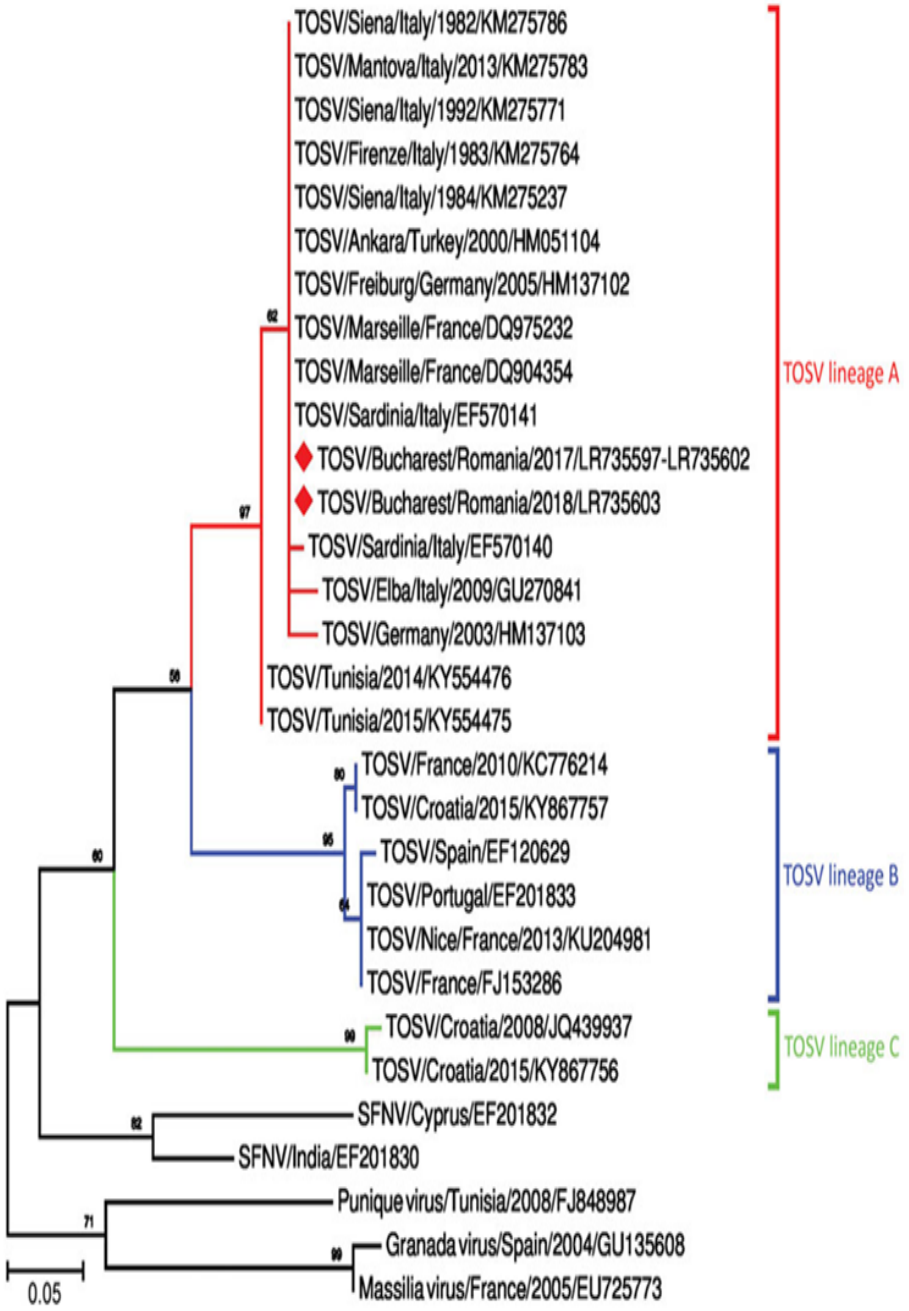
The emergence of TOSV in an urban area in southeastern Romania warrants attention to the sand fly vector. During 1939–1952, according to clinical records, sand fly viruses causing sandfly fever (i.e., 3-day fever or pappataci fever), transmitted by *Phlebotomus papatasi* sandflies, were thought to be circulating in southern Romania, with outbreaks occurring during the summer months. Bucharest and the surrounding Ilfov County area were thought to have been affected during 1944–1946. During recent years, the distribution of some *Phlebotomus* sand fly species harboring TOSV was updated for Romania, including *P. perfiliewi, P. neglectus, P. sergenti*, but not *P. perniciosus*

Lineage A - Italy and southern France, in northern Africa (Tunisia), and in central and northern Anatolia (Turkey), Romania.
Lineage B - Spain, France, Portugal, Croatia, Morocco, and Turkey.
Lineage C - Croatia, where it was co-circulating with lineage B TOSV

A novel variant of TOSV most closely related to lineage C has been detected in Greece

Other co-circulation of different lineages has been reported France and Turkey (lineages A and B)

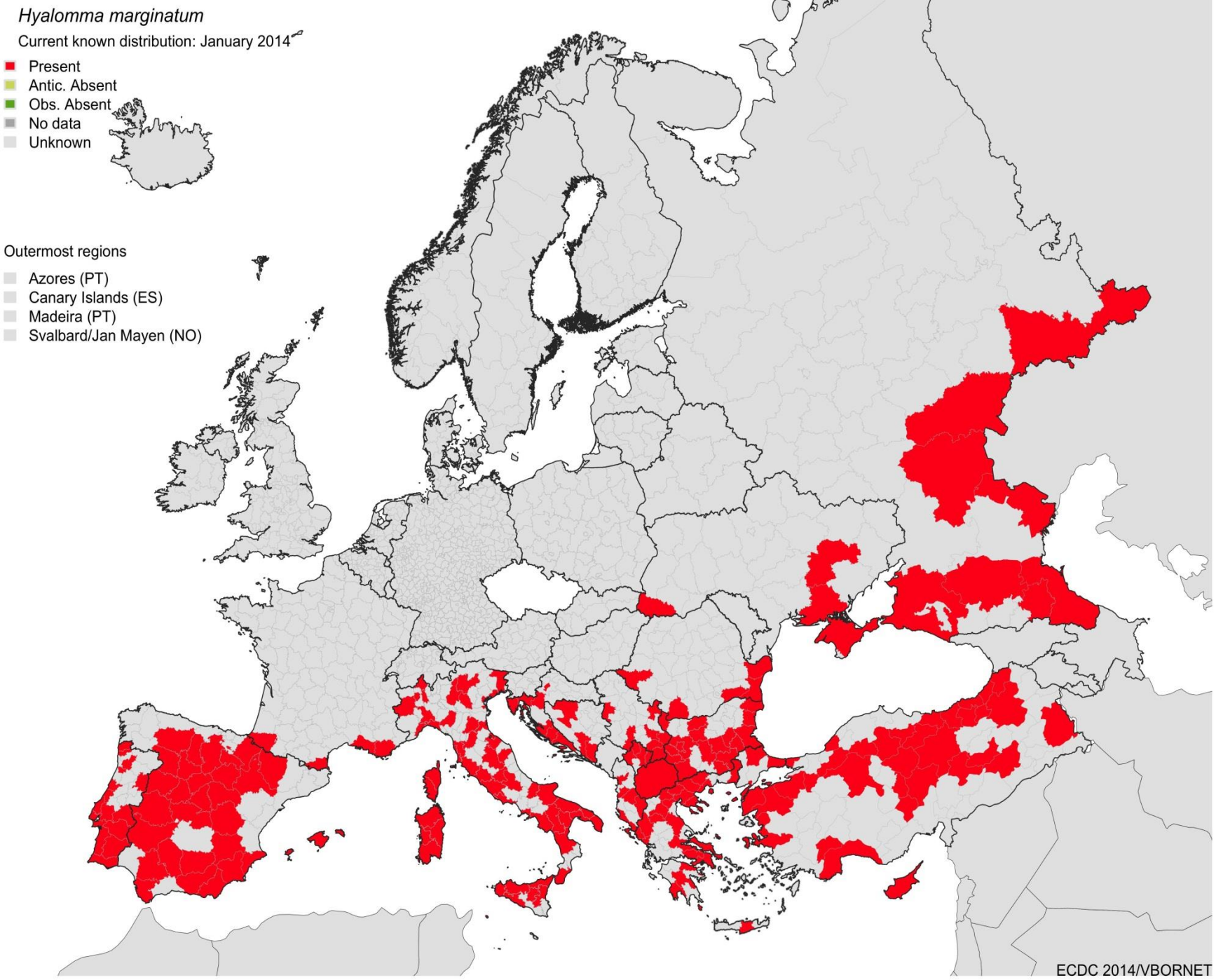
No differences have been observed in the clinical picture or disease severity associated with these TOSV genotypes



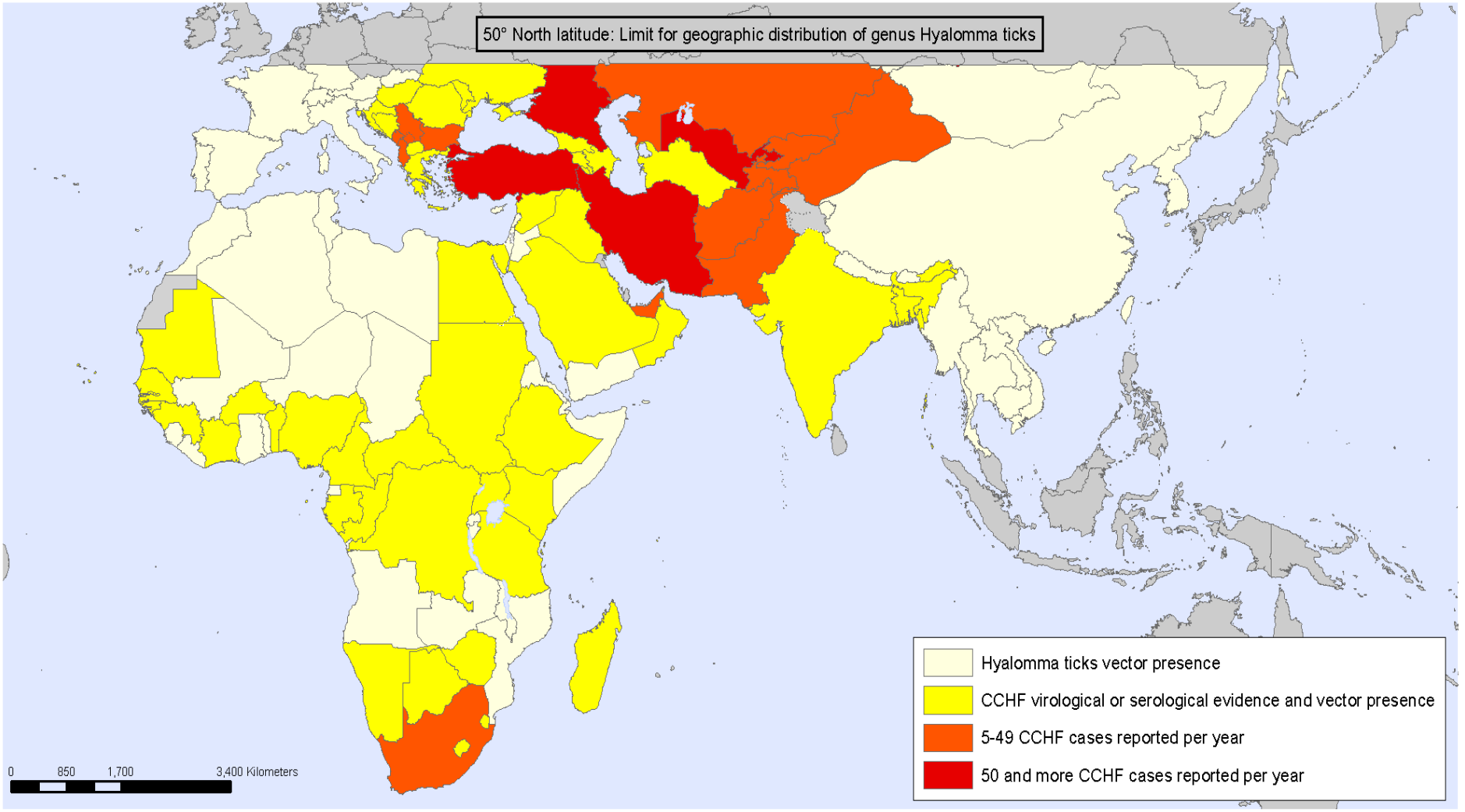
Virusul CCHF

- Nairovirus fam Bunyaviridae
- ARN simplu spiralat
- Descris in 1944 in Crimeea si in 1969 in Congo
- Locatie Europa de est (in special in fosta URSS), zona Marii Mediterane, N-V Chinei, Asia Centrala, Europa de Sud, Africa, Orientul Mijlociu si subcontinentul Indian

Hyalomma marginatum


Hyalomma marginatum
Current known distribution: January 2014
Present
Antic. Absent
Obs. Absent
No data
Unknown
Outermost regions
Azores (PT)
Canary Islands (ES)
Madeira (PT)
Svalbard/Jan Mayen (NO)
ECDC 2014/VBORNET

Geographic distribution of Crimean-Congo Haemorrhagic Fever



Data Source: World Health Organization
Map Production: Public Health Information and Geographic Information Systems (GIS)
World Health Organization

World Health Organization

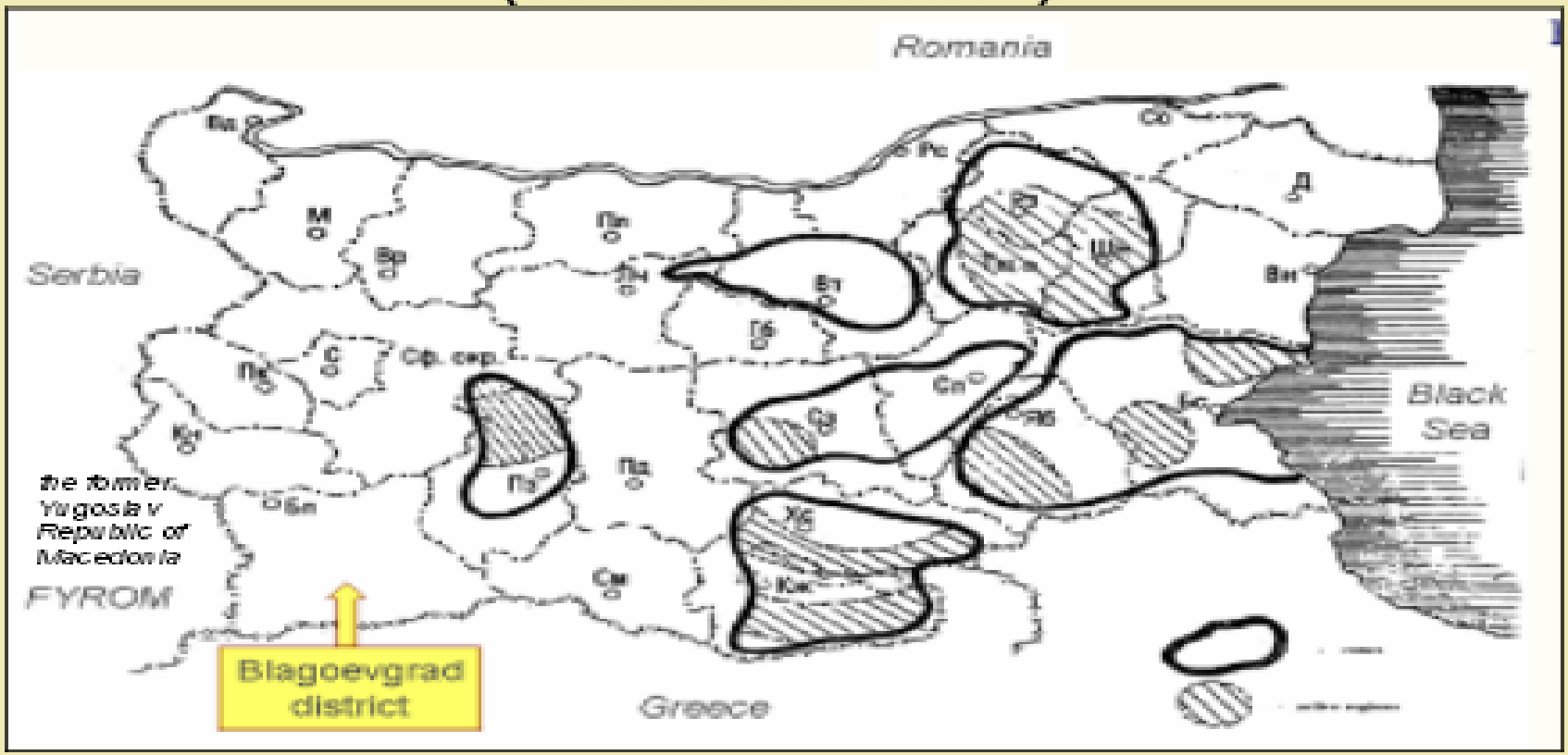
Albania

- 1986 primul caz uman
- 1986-1990 35 cazuri (S. Bino. Joint WHO-MZCP Intercountry Workshop on Crimean-Congo Haemorrhagic fever (CCHF) Prevention and Control, Istanbul, Turkey 6–8, November 2006)
- 2001-2006 32 cazuri (Insitutul de Sanatate Publica Albania)

Bulgaria

- 1952 primul caz
- 1953-1974 1105 cazuri (mortalitate 17%)
  20 nozocomiale (52% mortalitate)
- 1975-1996 279 cazuri (mortalitate 11,4%)
- 1997-2004 127 cazuri (27 decese)

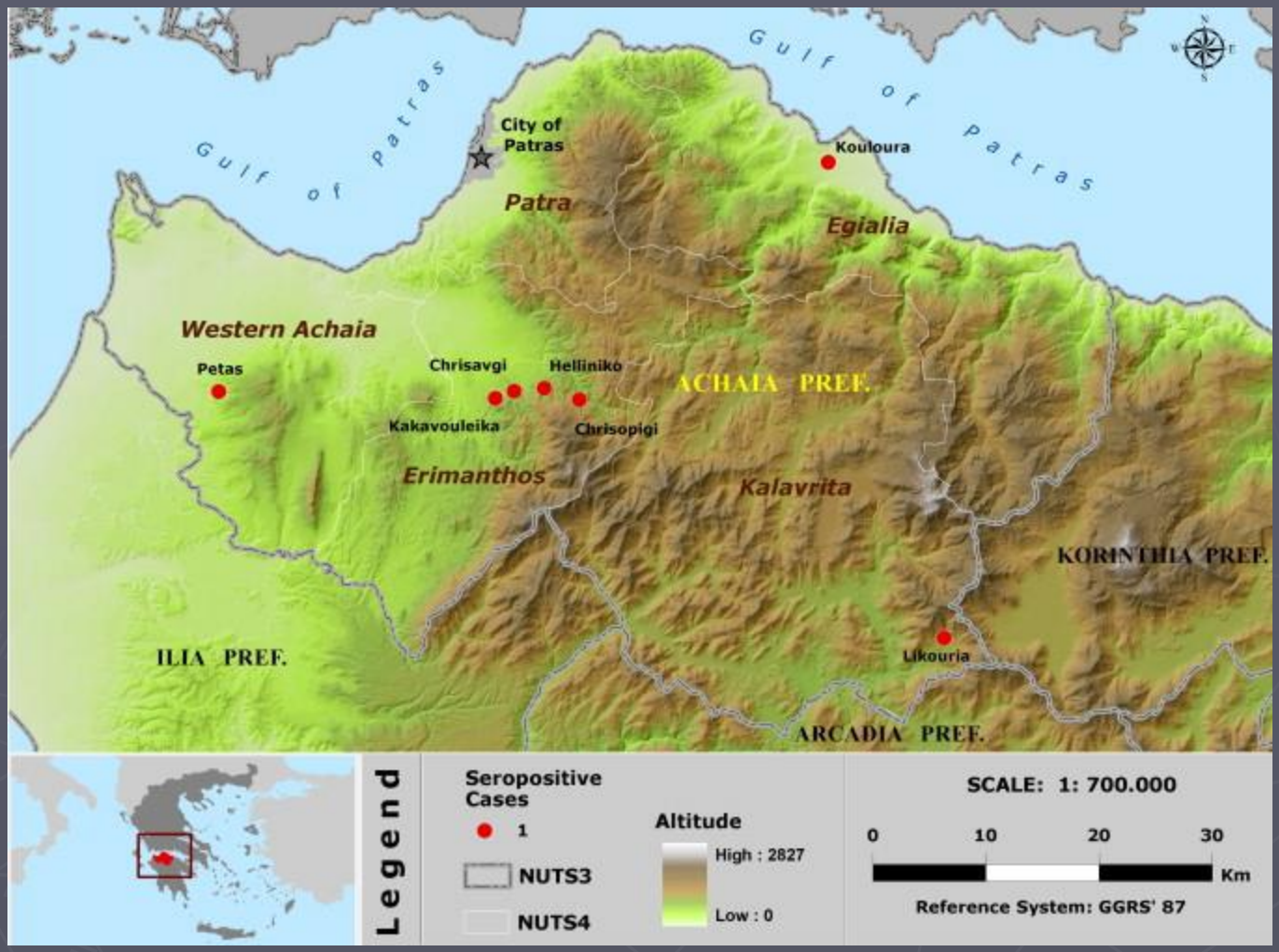
Fig. 8. Zones where CCHF circulates in ticks and endemic zones in Bulgaria and Blagoevgrad, District Bulgaria (Source: W.Monev [4]).



[4] W. Monev. Joint WHO-MZCP Intercountry Workshop on Crimean-Congo Haemorrhagic fever (CCHF) Prevention and Control, Istanbul, Turkey 6–8 November 2006.

Grecia

- 2008 primul caz uman (tulpina Rhodopi)
- AP92 tulpina FHCC din Grecia (patogenitate scazuta)



3,4% serologii IgG pozitive pentru FHCC

Int J Infect Dis. 2013 Dec;17(12):e1160-5. doi: 10.1016/j.ijid.2013.07.015. Epub 2013 Sep10.**Crimean-Congo hemorrhagic fever: seroprevalence and risk factors among humans in Achaia, western Greece .**Sargianou M1, Panos G, Tsatsaris A, Gogos C, Papa A.

Kosovo

- 1954 primul caz (epidemie de 8 cazuri)

- 1995-2008 140 cazuri confirmate din 487 suspectate

  35 decese

N. Ramadani, A. Kalaveshi: Crimean-Congo Haemorrhagic Fever (CCHF) in Kosova. Presentation, Department of Epidemiology, National Institute of Public Health, Prishtina, 9 septembre 2008

Rusia

- Sud-vest dupa 1999 (27 de ani nu au fost cazuri umane)

- 839 cazuri (27 decese) (Sursa : Rospotrebnadzor)

Turcia 2002

Karti SS, Odabasi Z, Korten V, Yilmaz M, Sonmez M, Caylan R, et al. Crimean-Congo hemorrhagic fever in Turkey. Emerg Infect Dis 2004 Aug

Turcia

- Primavara-vara 2002 Tokat si imprejurimi
- 2002-2008 2312 cazuri (122 decese)
- Personal medical 3 asistente si 4 medici (1 deces)

EpiSouth

Network for Communicable Disease Control in Southern Europe and Mediterranean Countries

InVS FRENCH INSTITUTE FOR PUBLIC HEALTH SURVEILLANCE Department of International & Tropical diseases

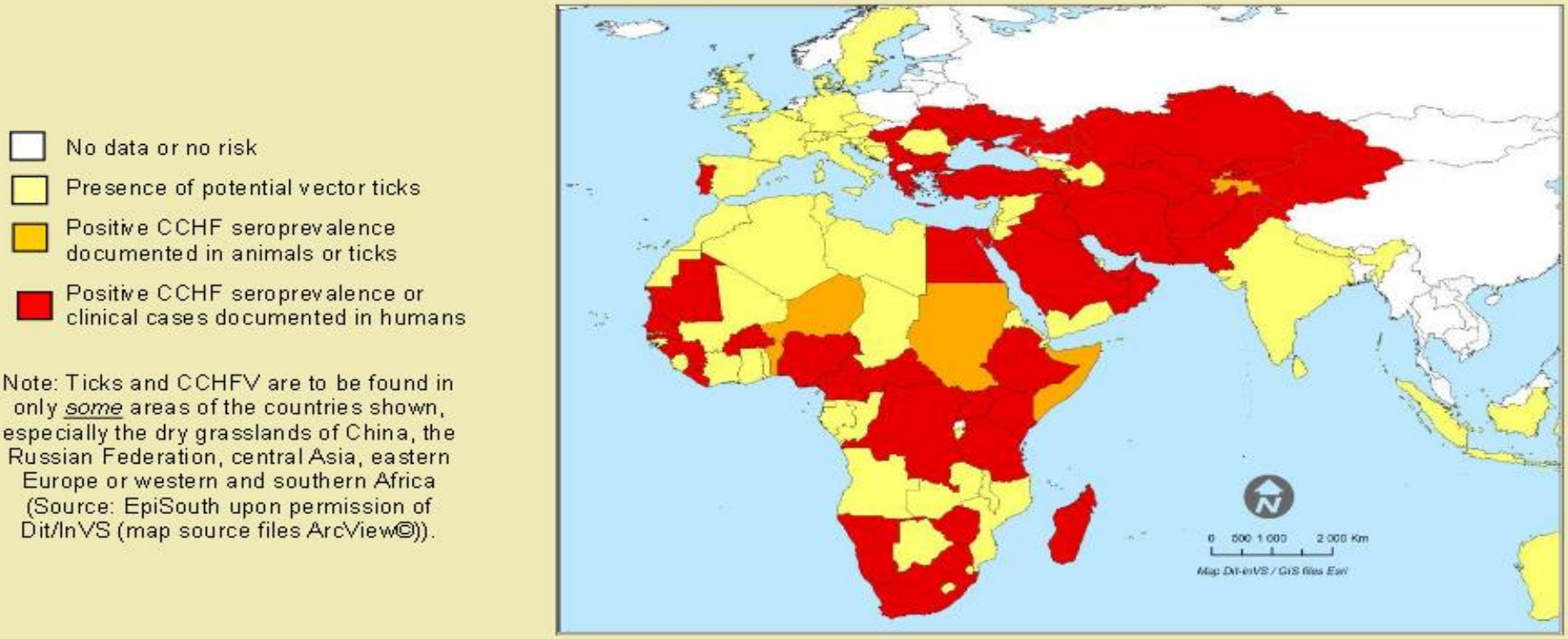
European Commission

Epidemiology of Crimean–Congo haemorrhagic fever virus: Albania, Bulgaria, Greece, Islamic Republic of Iran, Kosovo, Russian Federation, Turkey.

1st October 2008

This document was jointly developed by EpiSouth and the World Health Organization Regional Office for Europe.

Fig. 1. Distribution of vector tick species and known areas of Crimean–Congo haemorrhagic fever (CCHF) seroprevalence, 1944–2008.



Note: Ticks and CCHFV are to be found in only *some* areas of the countries shown, especially the dry grasslands of China, the Russian Federation, central Asia, eastern Europe or western and southern Africa (Source: EpiSouth upon permission of Dit/InVS (map source files ArcView©)).

VECTOR-BORNE AND ZOONOTIC DISEASES
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First Serologic Evidence for the Circulation of Crimean-Congo Hemorrhagic Fever Virus in Romania

Cornelia Svetlana Ceianu,[1] Raluca Ioana Panculescu-Gatej,[1] Daniel Coudrier,[2] and Michele Bouloy[2]

Abstract

Serum samples from sheep in localities situated in the county of Tulcea, Northern Dobrogea, were tested with an IgG sandwich ELISA using a recombinant Crimean-Congo hemorrhagic fever virus (CCHFV) antigen. In all, 131 sera out of 471 tested (27.8%) had IgG antibodies specific to CCHFV. This is the first evidence for the circulation of CCHFV virus in Romania.

Key Words: Antibodies—Crimean-Congo hemorrhagic fever virus—Romania—Sheep.

Introduction

Crimean-Congo hemorrhagic fever virus (CCHFV) belongs to the genus *Nairovirus* in the Bunyaviridae family, and is a human pathogen that can cause a severe, often fatal, hemorrhagic fever. CCHFV is the most geographically widespread tick-borne virus of medical importance (Ergonul 2006). CCHFV is endemic in many areas in Africa, Asia, and in southeastern Europe. It produced outbreaks in Bulgaria, Albania, and Kosovo, southwestern Russia, Ukraine, Turkey (Maltezou et al. 2010), and recently emerged as a human

southeast Romania, across the Dobrogea historical province. Among livestock raised in this area, sheep are the most common. The objective of the present study was to investigate whether sheep in the county of Tulcea, situated in northern Dobrogea, have antibodies to CCHFV.

Materials and Methods

Samples

Serum samples to test for CCHFV antibodies were obtained

Va multumesc!