



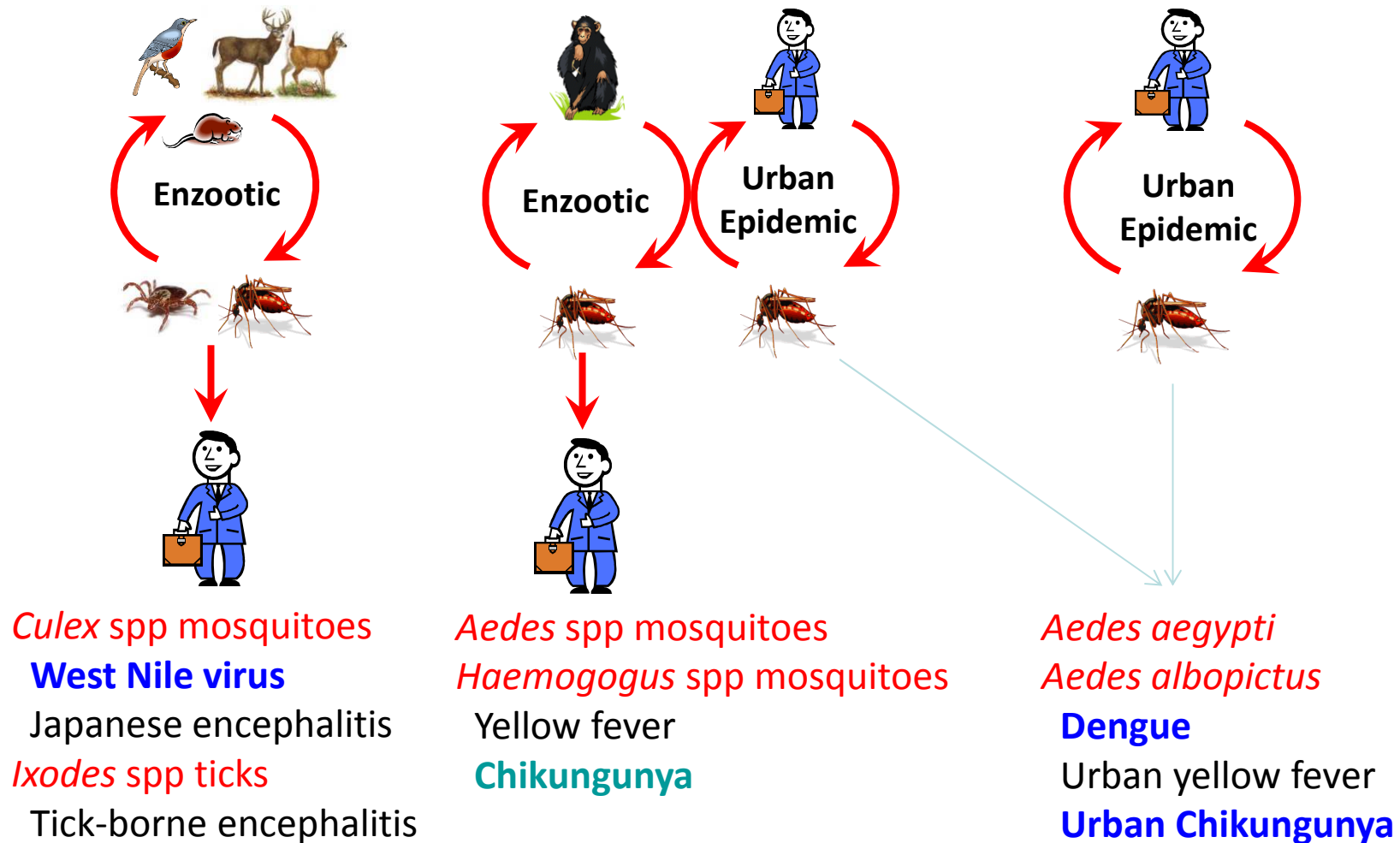
WEST NILE VIRUS, DENGUE VIRUS, CHIKUNGUNYA VIRUS IN ITALIA



IRCCS Ospedale
Sacro Cuore Don Calabria
PRESIDIO OSPEDALIERO ACCREDITATO - REGIONE VENETO

Federico Gobbi

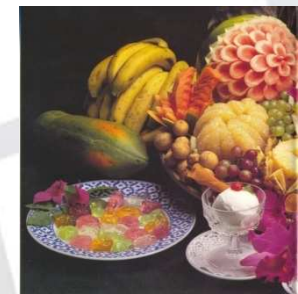
General Patterns of Viral and Bacterial Vector-Borne Disease Transmission



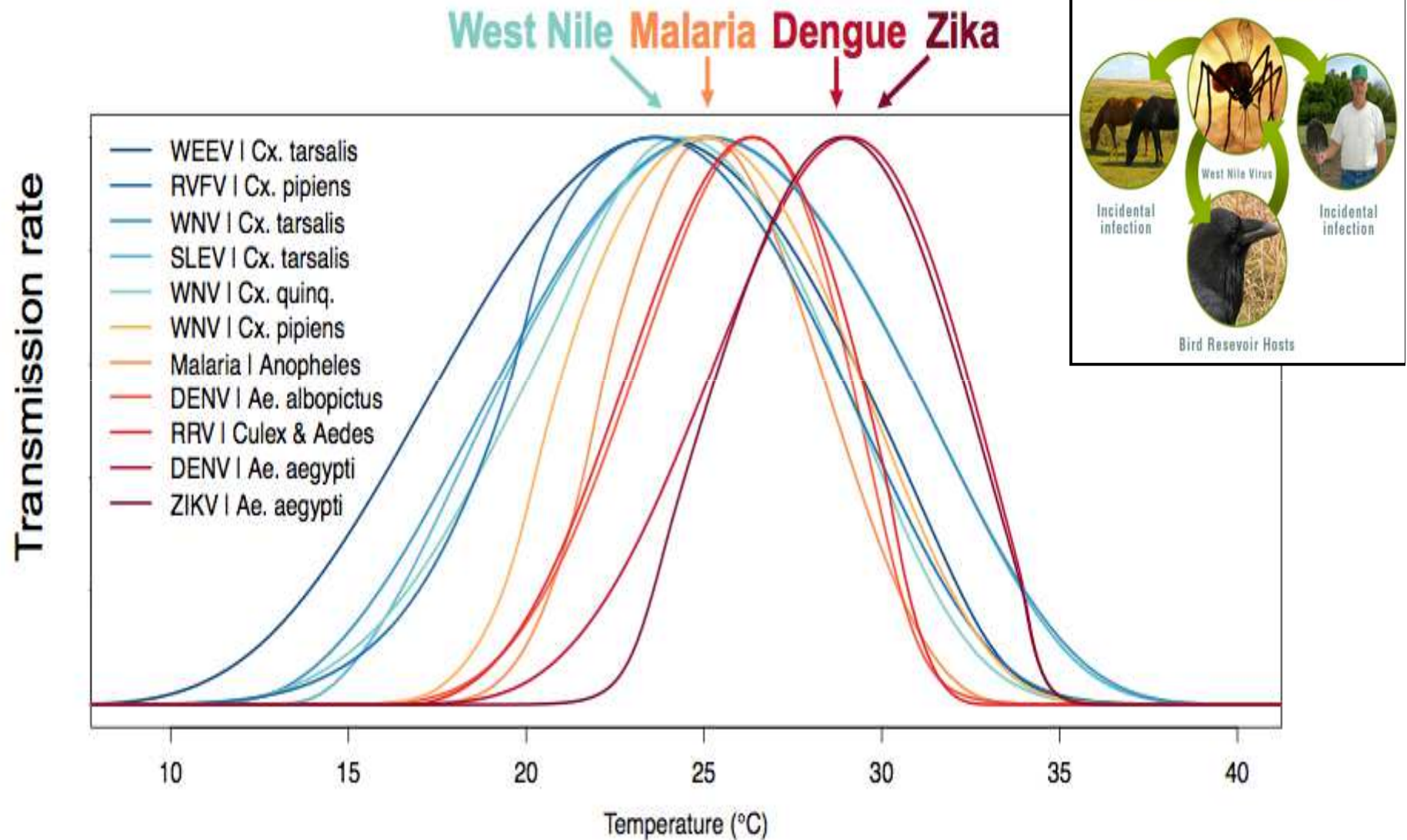
ARBO (ARthropod-BORne) - virus

Virus	Family/Genus
Yellow fever virus	Flaviviridae/Flavivirus
Dengue virus	Flaviviridae/Flavivirus
Japanese encephalitis virus	Flaviviridae/Flavivirus
West Nile virus	Flaviviridae/Flavivirus
Tick-borne encephalitis virus	Flaviviridae/Flavivirus
Zika virus	Flaviviridae/Flavivirus
Chikungunya	Togaviridae/Alphavirus
Toscana virus	Bunyaviridae/Phlebovirus
Rift Valley virus	Bunyaviridae/Phlebovirus

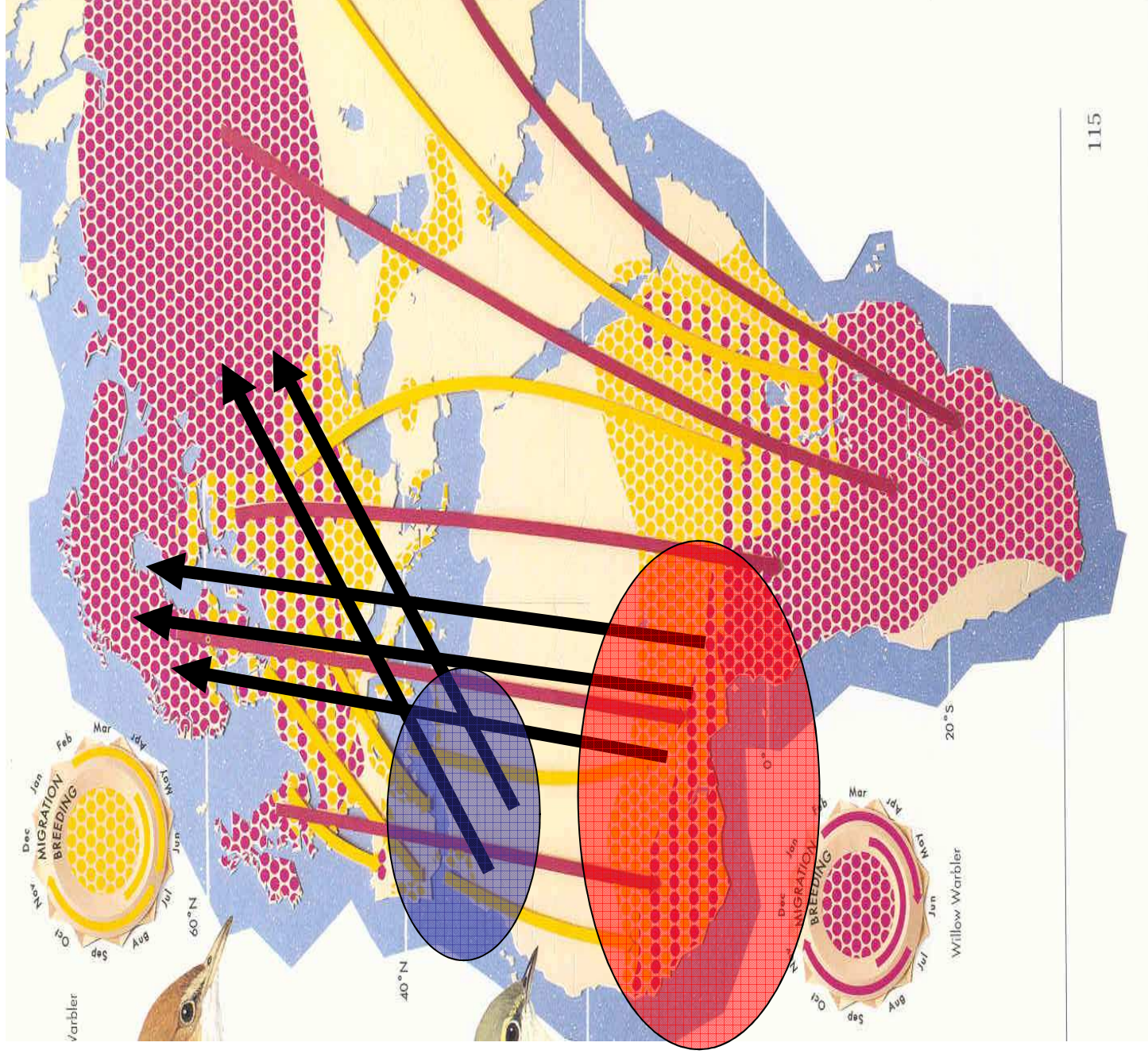
Globalizzazione



Will climate change **shift** disease burden across the world?



Mordecai et al. 2013, 2017, Johnson et al. 2015, Shocket et al. 2018, in prep, Tesla et al. 2018



Rapid communications

FIRST HUMAN CASE OF WEST NILE VIRUS NEUROINVASIVE INFECTION IN ITALY, SEPTEMBER 2008 – CASE REPORT

G Rossini¹, F Cavrini¹, A Pierro¹, P Macini², A. C. Finarelli², C Po², G Peroni³, A Di Caro⁴, M Capobianchi⁴, L Nicoletti⁵, M P Landini¹, V Sambri (vittorio.sambri@unibo.it)¹

9 ottobre 2008

On 20 September 2008, the laboratory of the Regional Reference Centre for Microbiological Emergencies (Centro di Riferimento Regionale per le Emergenze Microbiologiche, CRREM) in Bologna, reported the detection of specific IgM and IgG antibodies against West Nile virus (WNV) in the serum of a female patient in her eighties who lived in a rural area between Ferrara and Bologna, Italy.

Vettore: culex pipiens

**Compare in estate-autunno
(maggio- dicembre)**



Ciclo biologico



Amplifying hosts
Birds (serbatoio)



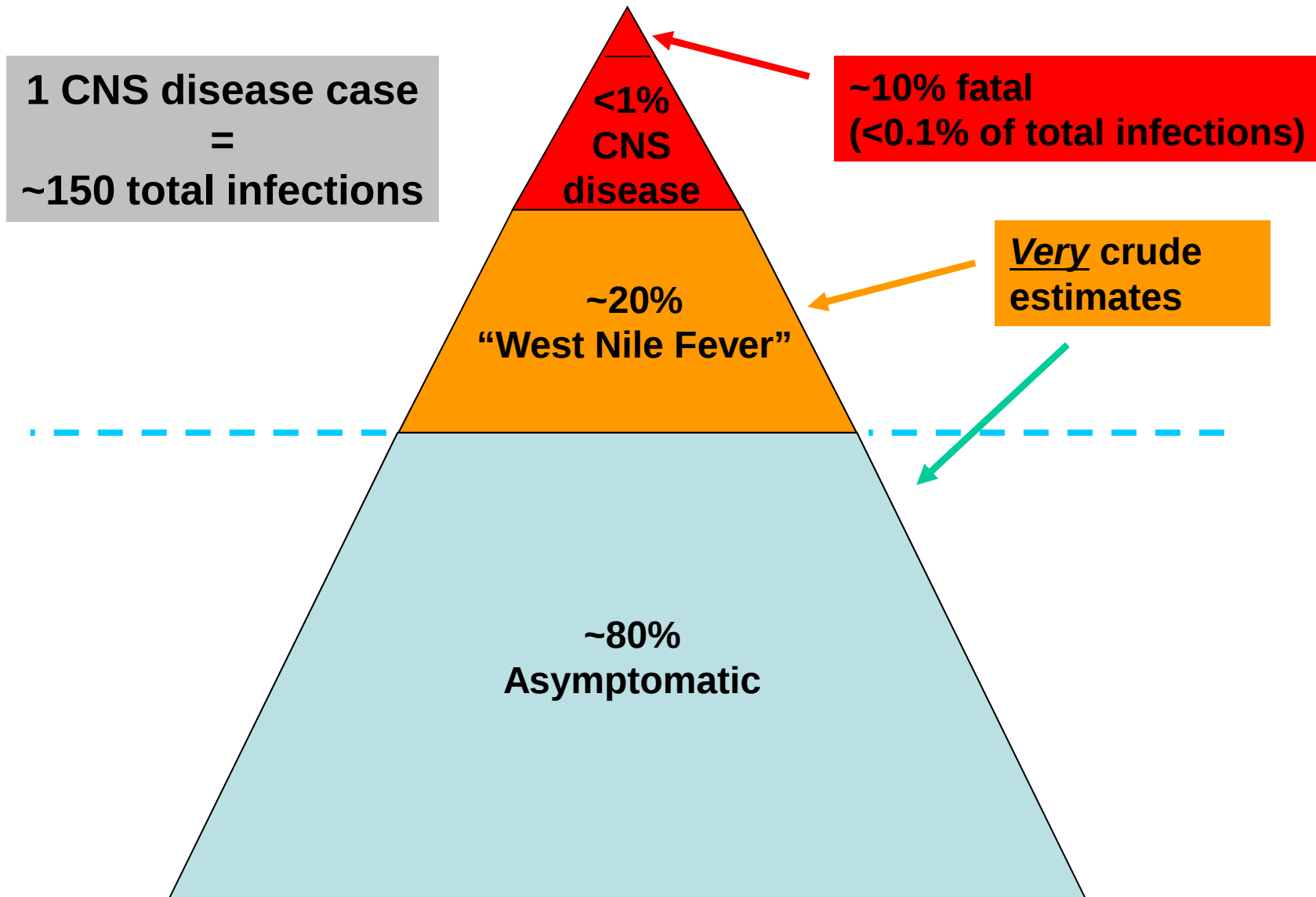
Culex sp., *Aedes sp.*,
Ochlerotatus sp. (vettori)

Incidental hosts
Humans, horses,
and other animals

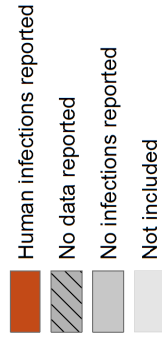


Toscana: casi in equini,
1998

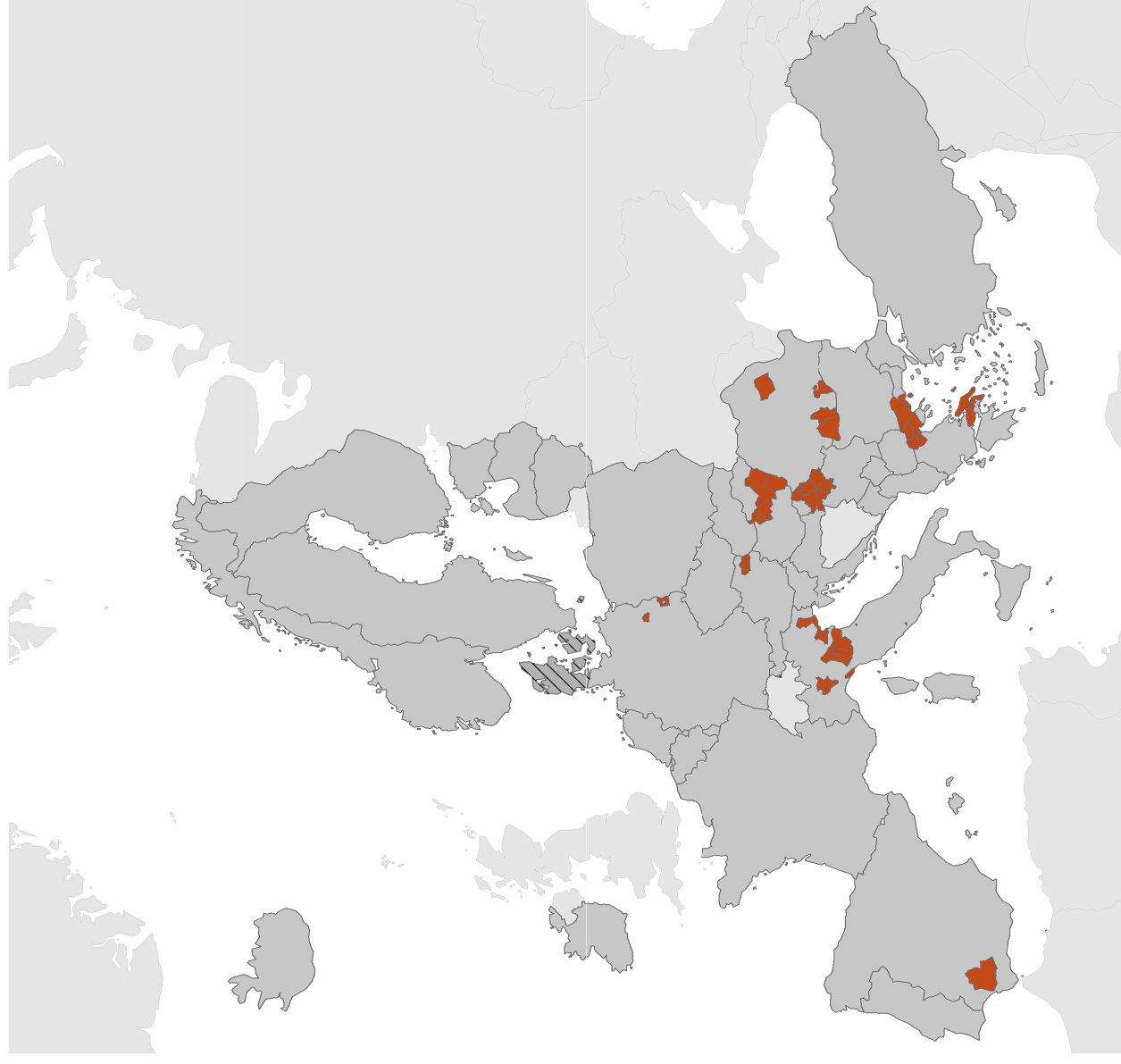
WNV infezione nell'uomo

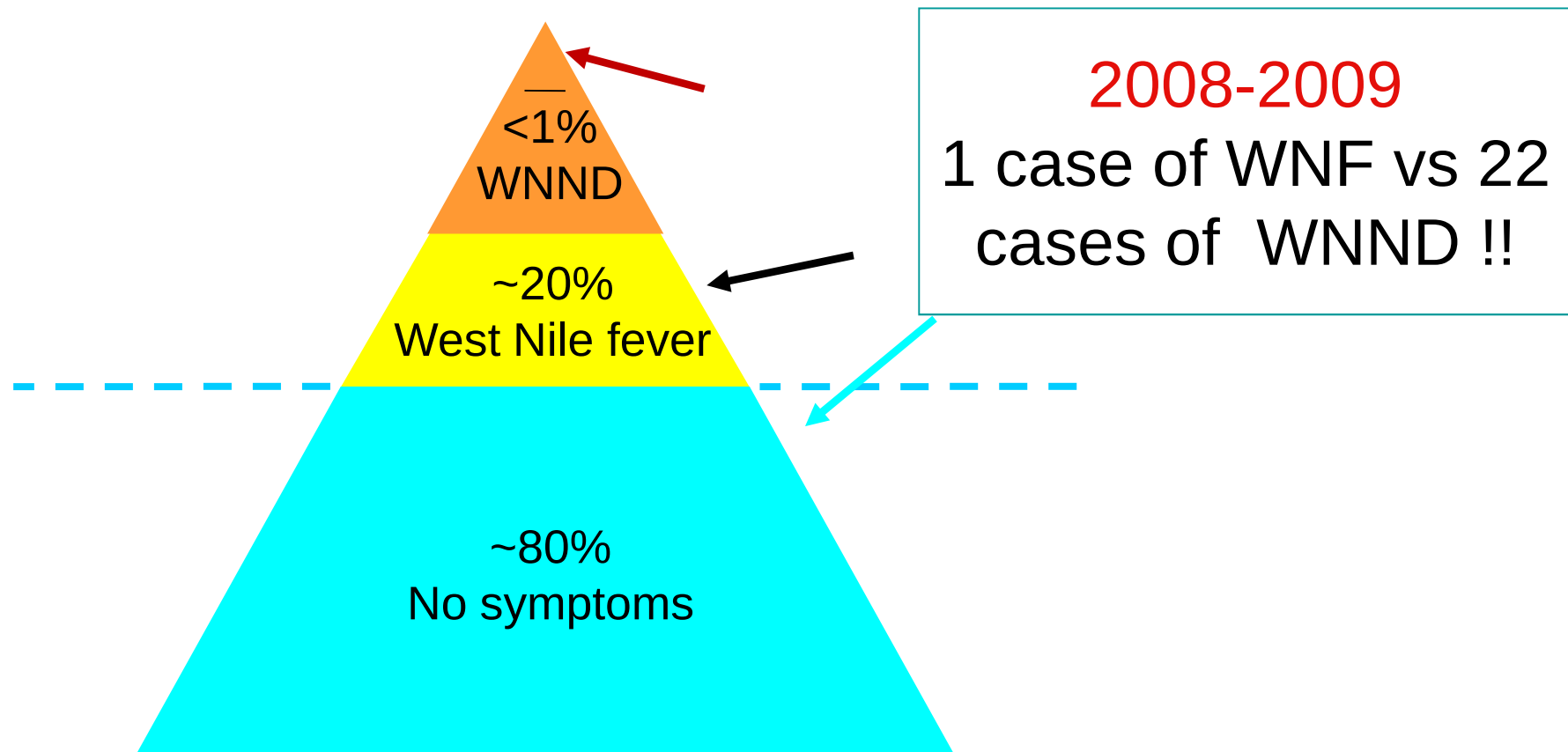


**Distribution of human West Nile virus infections
in NUTS 3 or GAUL 1 regions of the EU/EEA
and neighbouring countries during the 2021
season, as of 23 September 2021**

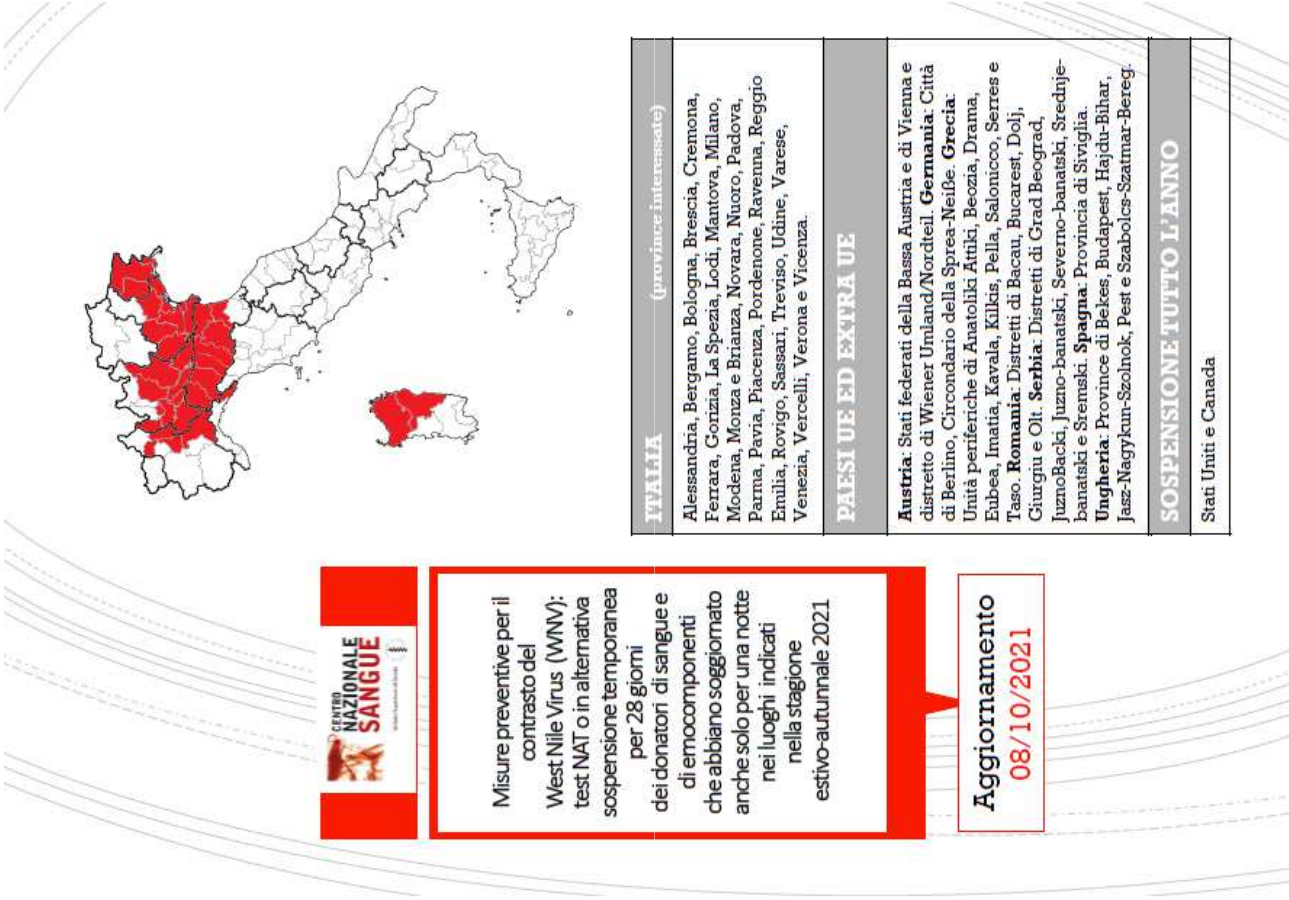


Countries not visible
in the main map extent





Gobbi F, Napoletano G, Piovesan C et al.
Where is West Nile fever? Lessons learnt from recent human cases in northern Italy.
***Euro Surveill.* 2009 12;14(10).**



ITALIA (provinces interested)	Alessandria, Bergamo, Bologna, Brescia, Cremona, Ferrara, Gorizia, La Spezia, Lodi, Mantova, Milano, Modena, Monza e Brianza, Novara, Nuoro, Padova, Parma, Pavia, Piacenza, Pordenone, Ravenna, Reggio Emilia, Rovigo, Sassari, Treviso, Udine, Varese, Venezia, Vercelli, Verona e Vicenza.
PAESI UE ED EXTRA UE	Austria: Stati federati della Bassa Austria e di Vienna e distretto di Wiener Umland/Nordteil. Germania: Città di Berlino, Circondario della Sprea-Neiße. Grecia: Unità periferiche di Anatoliki Atiki, Beozia, Drama, Eubea, Imatia, Kavala, Kilbis, Pella, Salonico, Serres e Taso. Romania: Distretti di Bacau, Bucarest, Dolj, Giurgiu e Olt. Serbia: Distretti di Grad Beograd, JuznoBacki, Juzno-banatski, Severno-banatski, Srednje-banatski e Sremski. Spagna: Provincia di Siviglia. Ungheria: Province di Beltes, Budapest, Hajdu-Bihar, Jasz-Nagykun-Szolnok, Pest e Szabolcs-Szatmar-Bereg.
SOSPENSIONE TUTTO L'ANNO Stati Uniti e Canada	

RAPID COMMUNICATIONS

West Nile virus: the Italian national transplant network reaction to an alert in the north-eastern region, Italy 2011

A Nanni Costa (centronazionale.trapianti@iss.it)¹, M R Capobianchi², G Ippolito², G Palù^{3,4}, L Barzon^{3,4}, G Piccolo⁵, B Andreetta⁶, M Filippetti¹, D Fehily¹, L Lombardini¹, P Grossi⁷

Eurosurveillance, 2011

TABLE

Molecular and serological test results for West Nile virus infection on samples from organ donor and recipients, Italy 2011 (n=6)

	NAT test result	Antibodies determination
Donor	Negative on blood	Positive (IgG and IgM) on blood
First kidney recipient	Positive on blood and spinal fluid	Positive (IgG and IgM) on blood and spinal fluid
Second kidney recipient	Positive on blood and spinal fluid	Positive (IgG and IgM) on blood and spinal fluid
Heart recipient	Negative on blood	Negative on blood
Liver recipient	Negative on blood	Positive (IgG and IgM) on blood
Lung recipient	Positive on blood	Positive (IgG and IgM) on blood





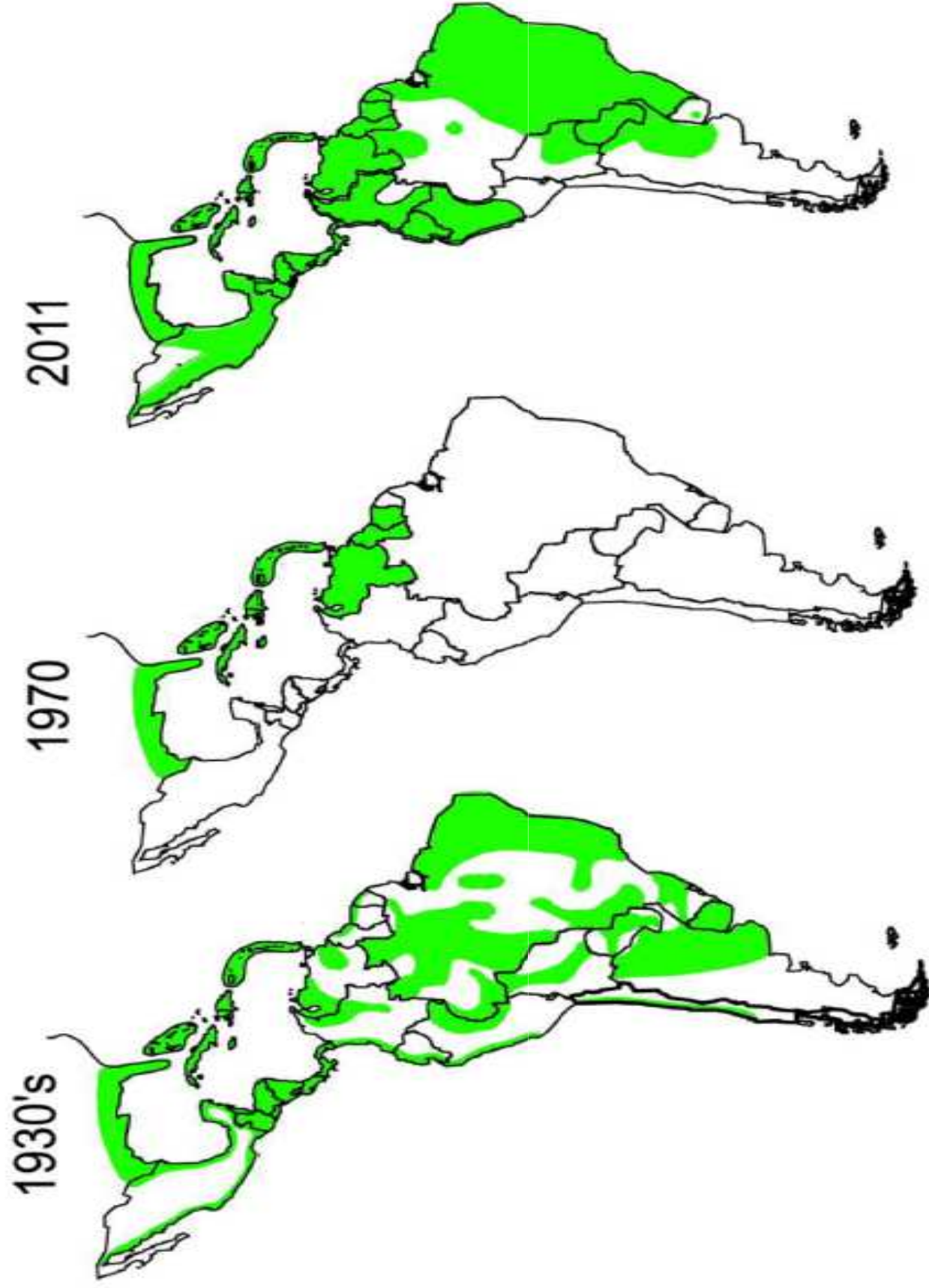
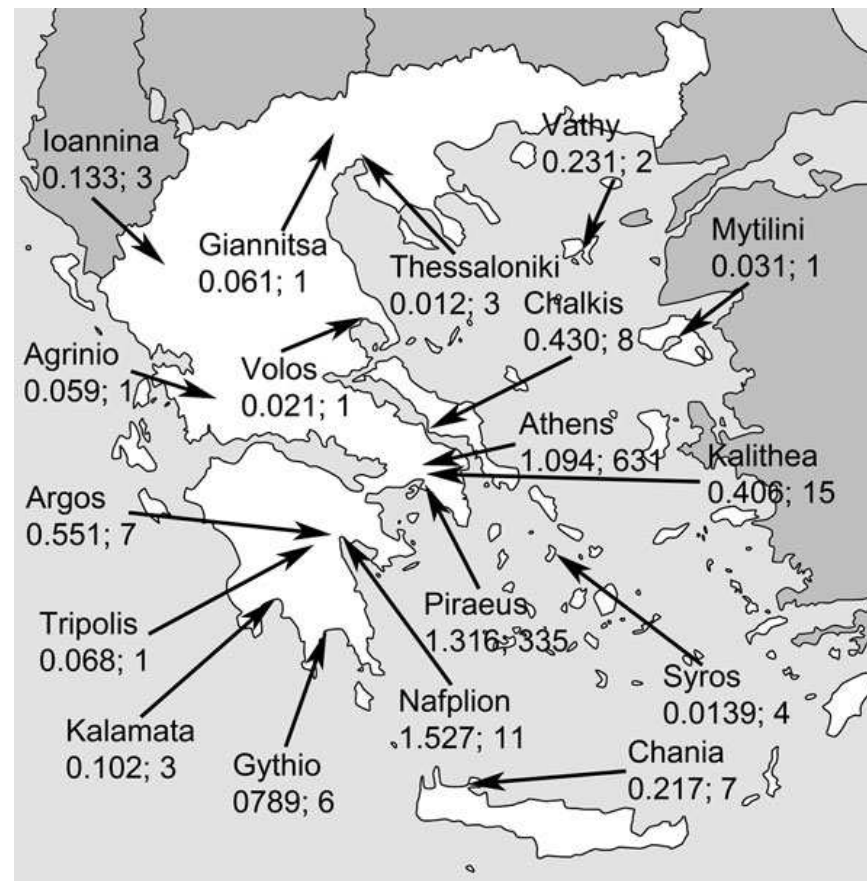


Fig 1. Distribution of *Aedes aegypti* in Western Hemisphere. From Gubler, Duane J. "Dengue, Urbanization and Globalization: The Unholy Trinity of the 21st Century." *Tropical Medicine and Health* 39.4 Suppl (2011): 3–11.PMC. Web. 4 Apr. 2016. <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3317603/figure/F3/>.

Daily Newspaper View of Dengue Fever Epidemic, Athens, Greece, 1927–1931

Christos Louis_ Author affiliation: Foundation for Research and Technology–Hellas, Heraklion, Greece; and University of Crete, Heraklion



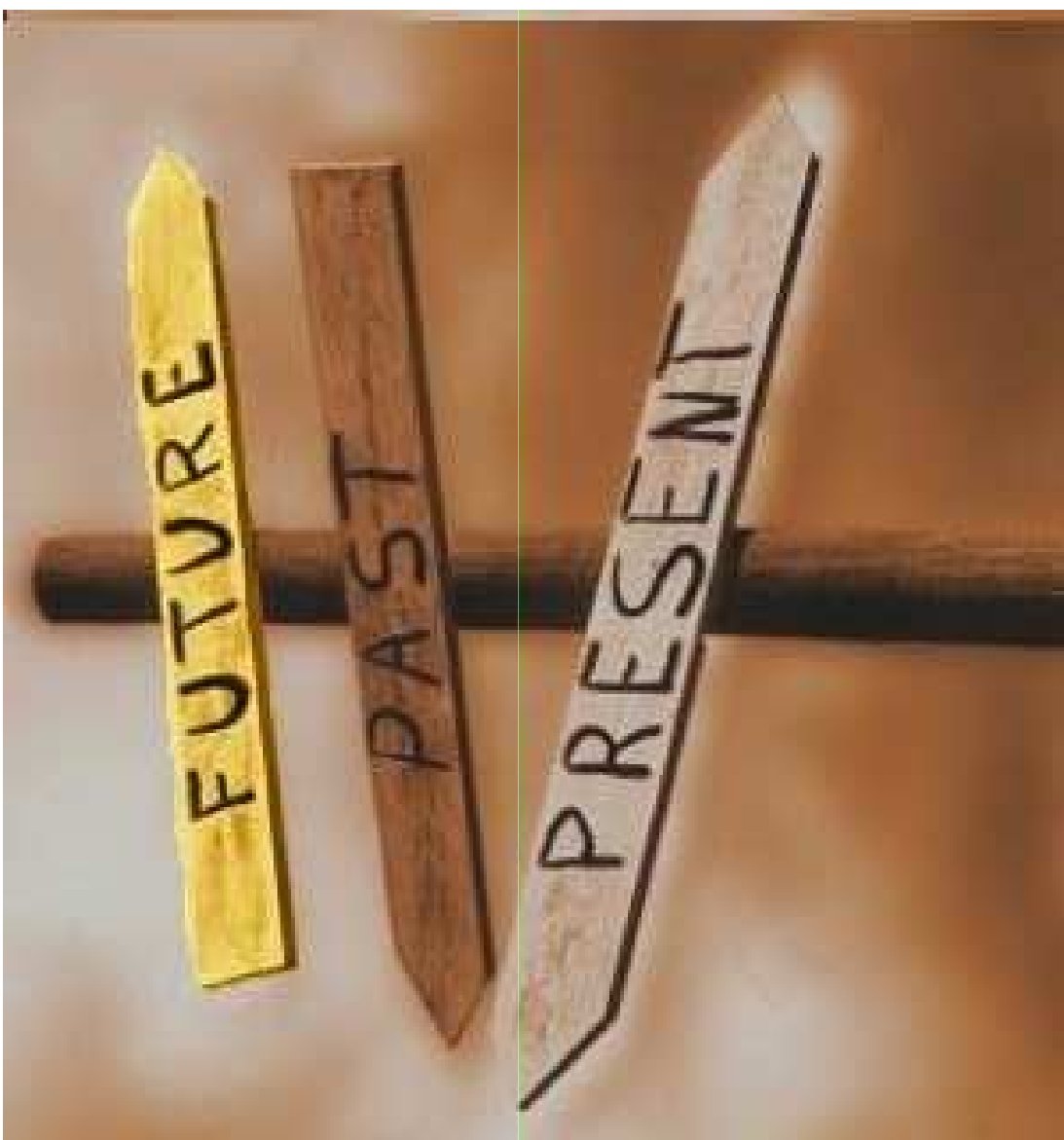
Dengue Fever Epidemic, Athens, Greece, 1927–1928

In the late summers of 1927 & 1928 a biphasic dengue fever epidemic hit Athens:

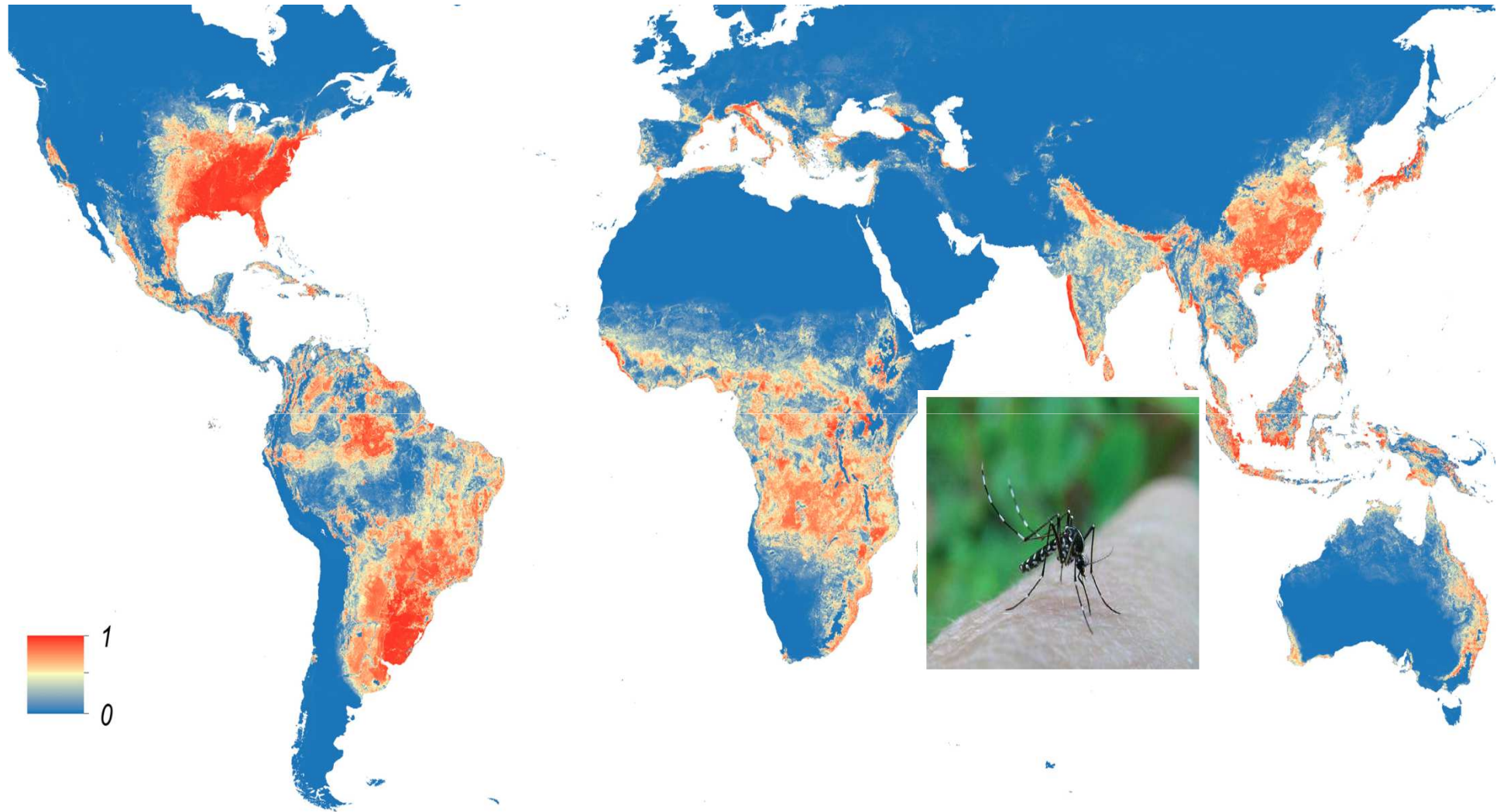
attack rate 75-90%, > 1000 fatal cases (whole country: 1553)



No. cases			
1928	Athens	Metropolitan area	Greece
	3,000 – 75,000		
Aug 15	25,000		
Aug 19	43,000		
Aug 23	80,000		
Aug 25	100,000		
Aug 27	150,000		
Aug 29	433,000	649,000	~ 75% of population
Aug 30	461,000	693,000	~ 80% of population
959,884 government statistics			

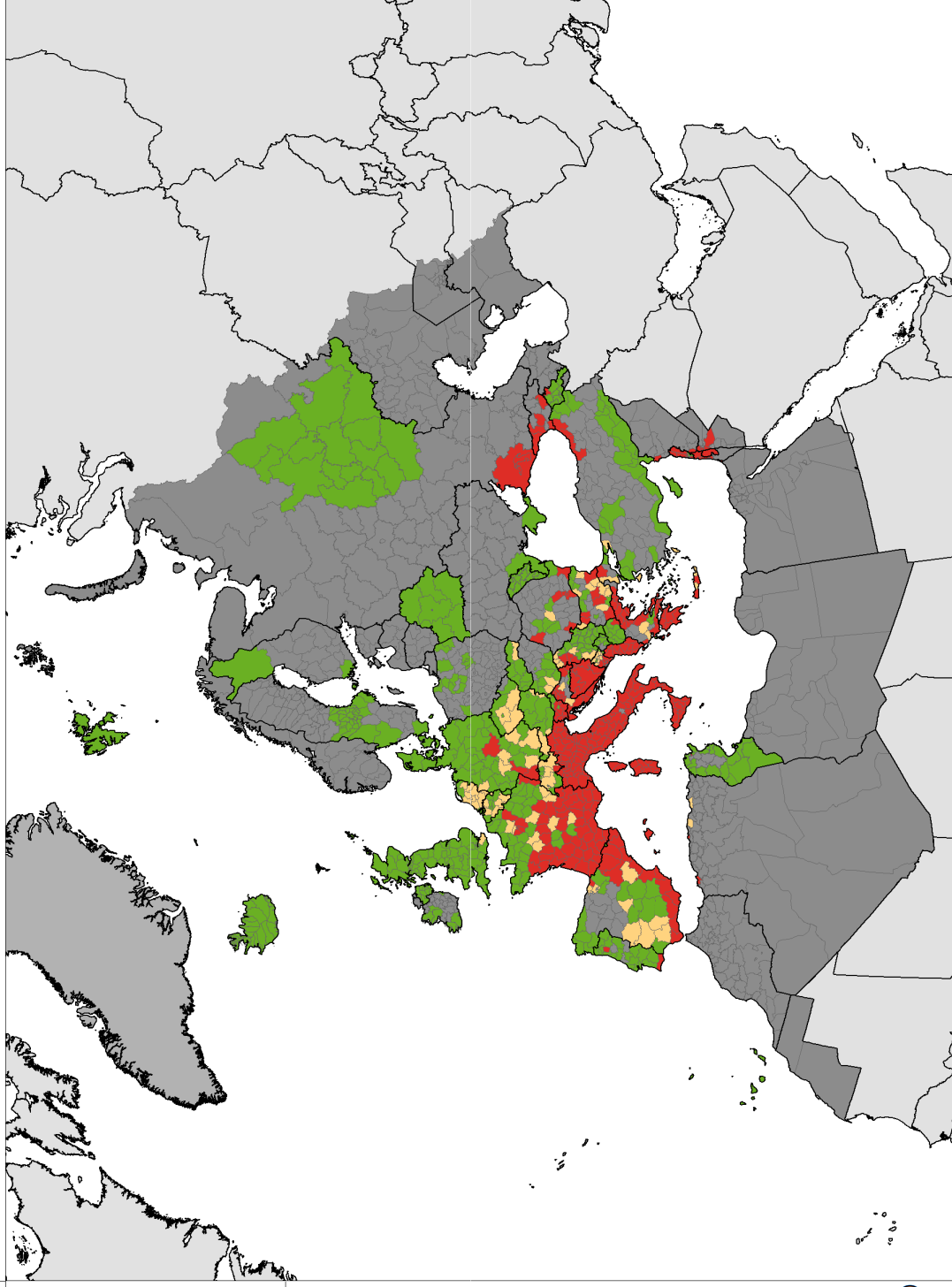


Aedes Albopictus (Asian tiger mosquito)



Can tolerate cooler temperatures than *Ae. aegypti*
Found at higher latitudes.

Aedes albopictus, May 2020



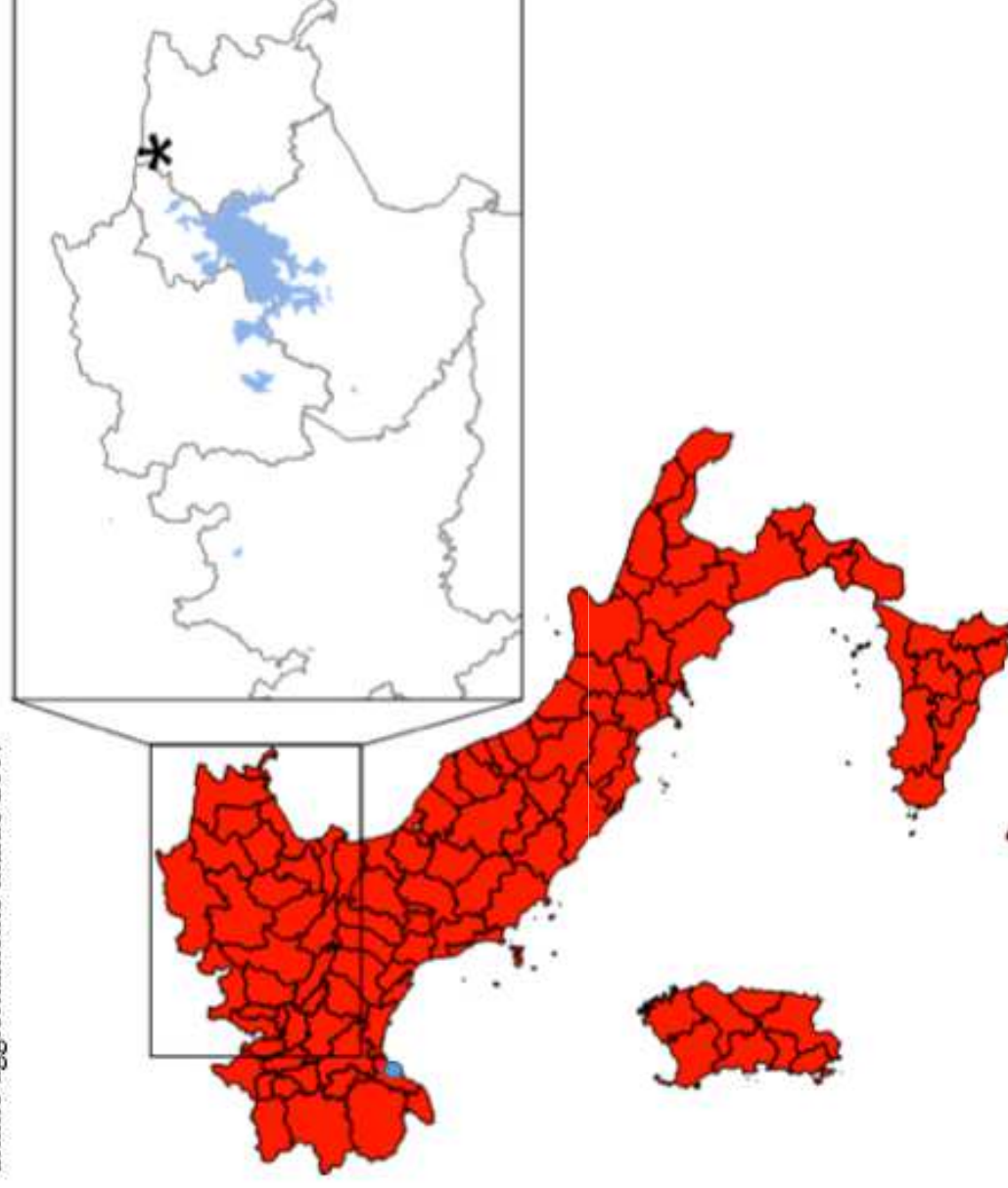
Legend

- Established
- Introduced
- Absent
- No data
- Unknown
- Outside scope

Countries/Regions not viewable in the main map extent*

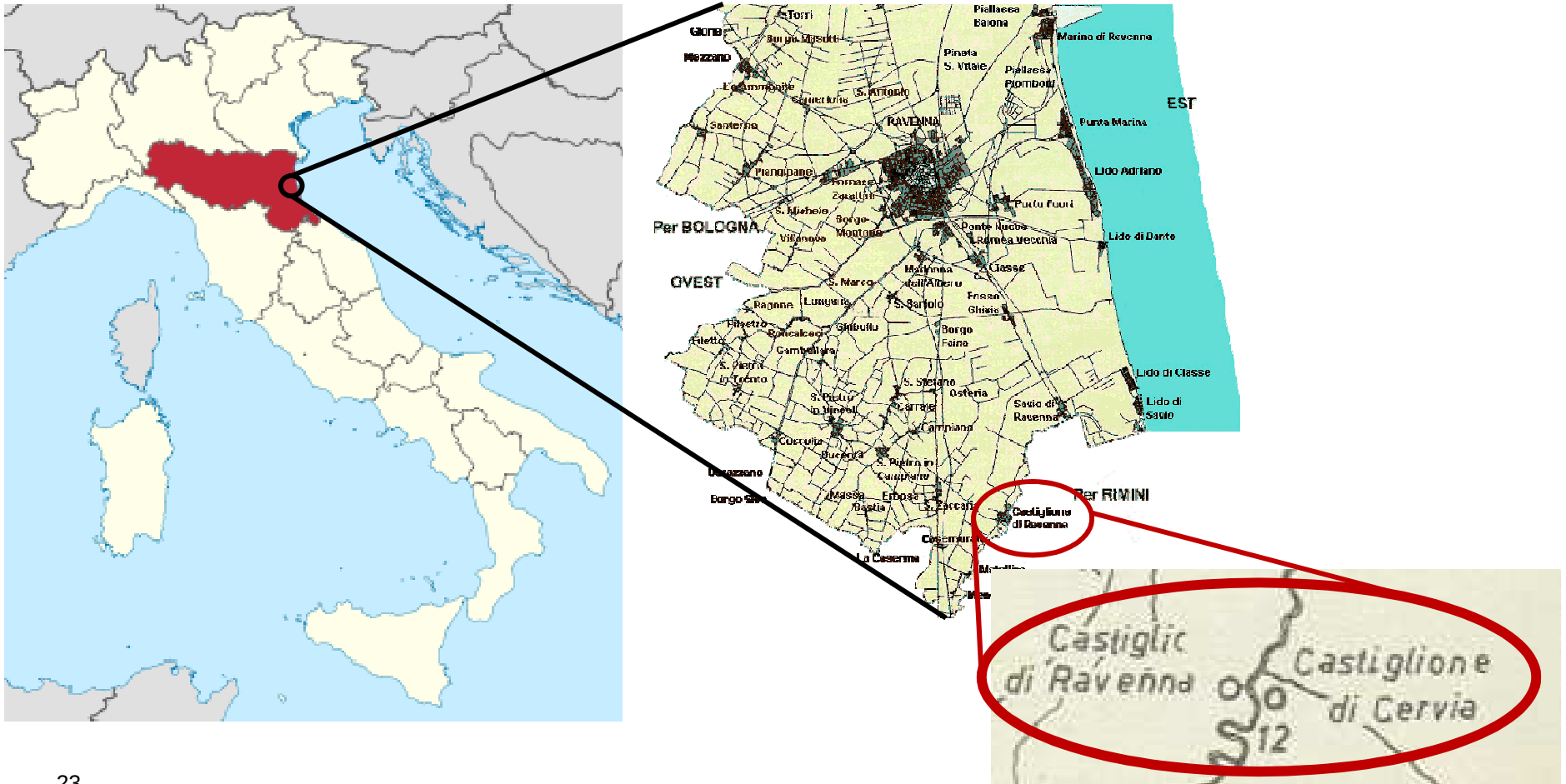
- Malta
- Monaco
- San Marino
- Gibraltar
- Liechtenstein
- Azores (PT)
- Canary Islands (ES)
- Madeira (PT)
- Jan Mayen (NO)

Figura 3. Mappa della presenza di *Aedes albopictus*, *Aedes koreicus* e *Aedes japonicus* in Italia - ultimo aggiornamento marzo 2017

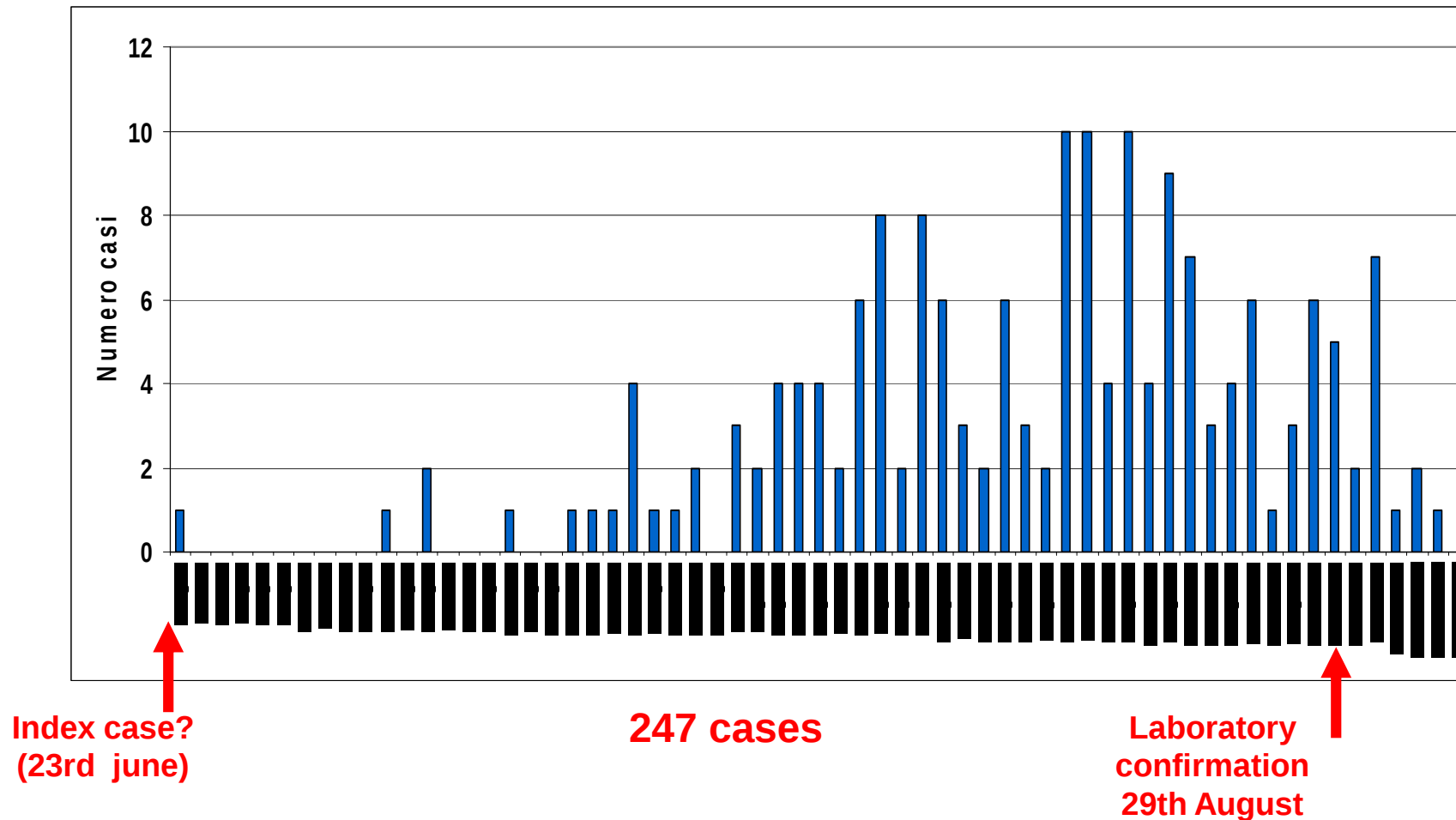


Legenda: Italia: distribuzione di *Ae. albopictus* per provincia: in rosso le province positive; Particolare: In azzurro l'area monitorata dove è stata rilevata la presenza di *Ae. koreicus*, 2011-2016 (Montarsi *et al.* Parasit Vectors 2015; Marcantonio *et al.* Parasit Vectors, 2016) e il recente ritrovamento nella città di Genova (Ballardini e al. EMCA Conference, 2017) * Primo rinvenimento di *Ae. japonicus* in Italia (Seidel *et al.* Parasit Vectors, 2016).

Chikungunya outbreak in Emilia-Romagna in summer 2007



Outbreak of **Chikungunya** in Northern Italy, year **2007**



Rezza G, Nicoletti L, Angelini R, Romi R,; CHIKV study group.
Infection with chikungunya virus in Italy: an outbreak in a temperate region.
Lancet. 2007 Dec 1;370(9602):1840-6.

THE VIREMIC PATIENT

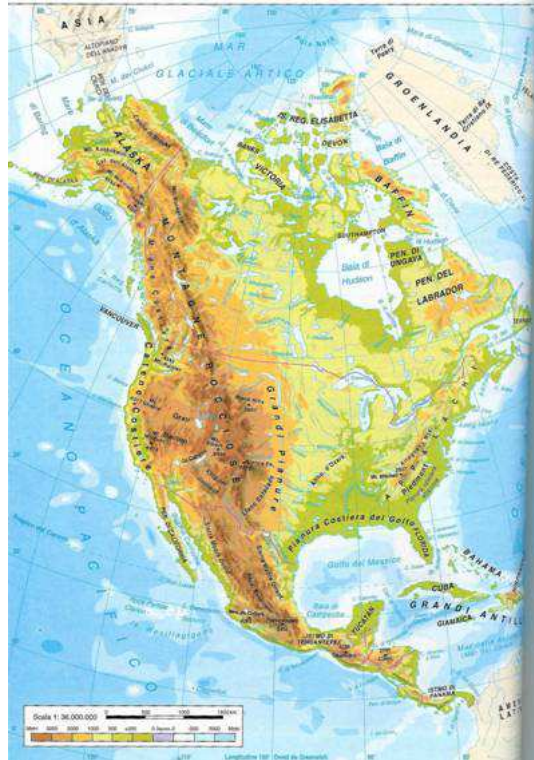
....coming from India.....



Rezza G, Nicoletti L, Angelini R, Romi R,; CHIKV study group.
Infection with chikungunya virus in Italy: an outbreak in a temperate region.
Lancet. 2007 Dec 1;370(9602):1840-6.

THE VECTOR

....coming from North America.....



Dalla Pozza G, Majori G
First record of *Aedes albopictus* establishment in Italy.
Journal of the American Mosquito Control Association 1992, 8(3):318-320.

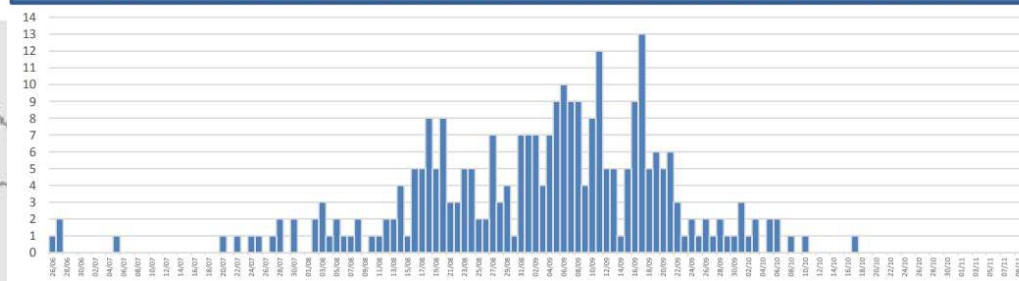
Chikungunya in Italia per la 2° volta

ITALIA: FOCOLAI AUTOCTONI DI INFEZIONE DA VIRUS CHIKUNGUNYA
(aggiornato al 10 Novembre 2017)



428 Casi notificati totali:
(Roma 62 casi)
359 Regione Lazio
61 Regione Calabria
5 Regione Emilia-Romagna
1 Regione Marche
2 Paesi Europei (Francia/Germania)

ANZIO: Curva Epidemica (abitanti ad Anzio o casi epidemiologicamente correlati), per data insorgenza
ANZIO: Epidemic curve (Anzio residents or cases or epidemiologically linked), date of onset



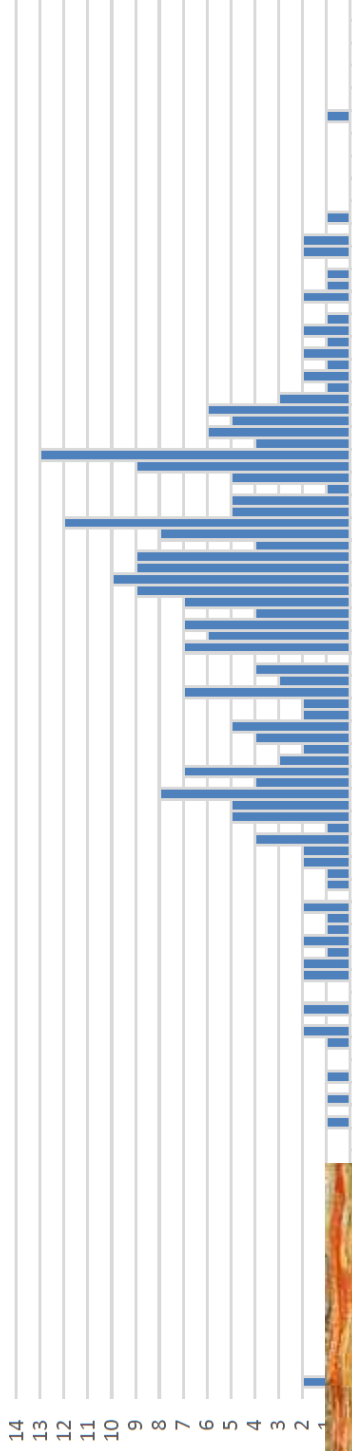
Primo caso 26/06/17 ; Ultimo 17/10/17

ECSA strain ; Non ha mutazione E1-A226V
100% homology with two strains from
Pakistan and India from 2016



ECDC. RAPID RISK ASSESSMENT Clusters of autochthonous chikungunya cases in Italy First update 9 October 2017
Ministero della Salute. ISS. Aggiornamento 10/11/17.
http://www.salute.gov.it/portale/temi/documenti/chikungunya/bollettino_chikungunya_ULTIMO.pdf

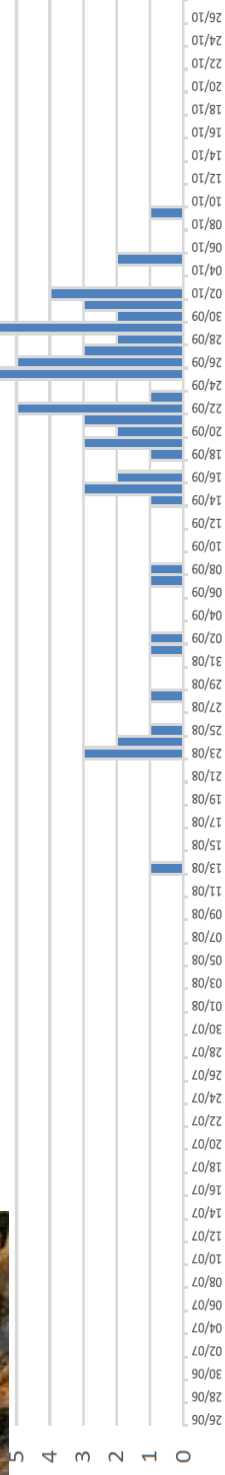
ANZIO: Curva Epidemica (abitanti ad Anzio o casi epidemiologicamente correlati), per data insorgenza ANZIO: Epidemic curve (Anzio residents or cases or epidemiologically linked), date of onset



A: Curva Epidemica (nessuna storia di viaggio) per data insorgenza sintomi
ROME: Epidemic Curve (no history of travel), date of onset



Calabria (Guardavalle marina): Curva Epidemica, per data insorgenza sintomi
Calabria Region: Epidemic Curve, date of onset

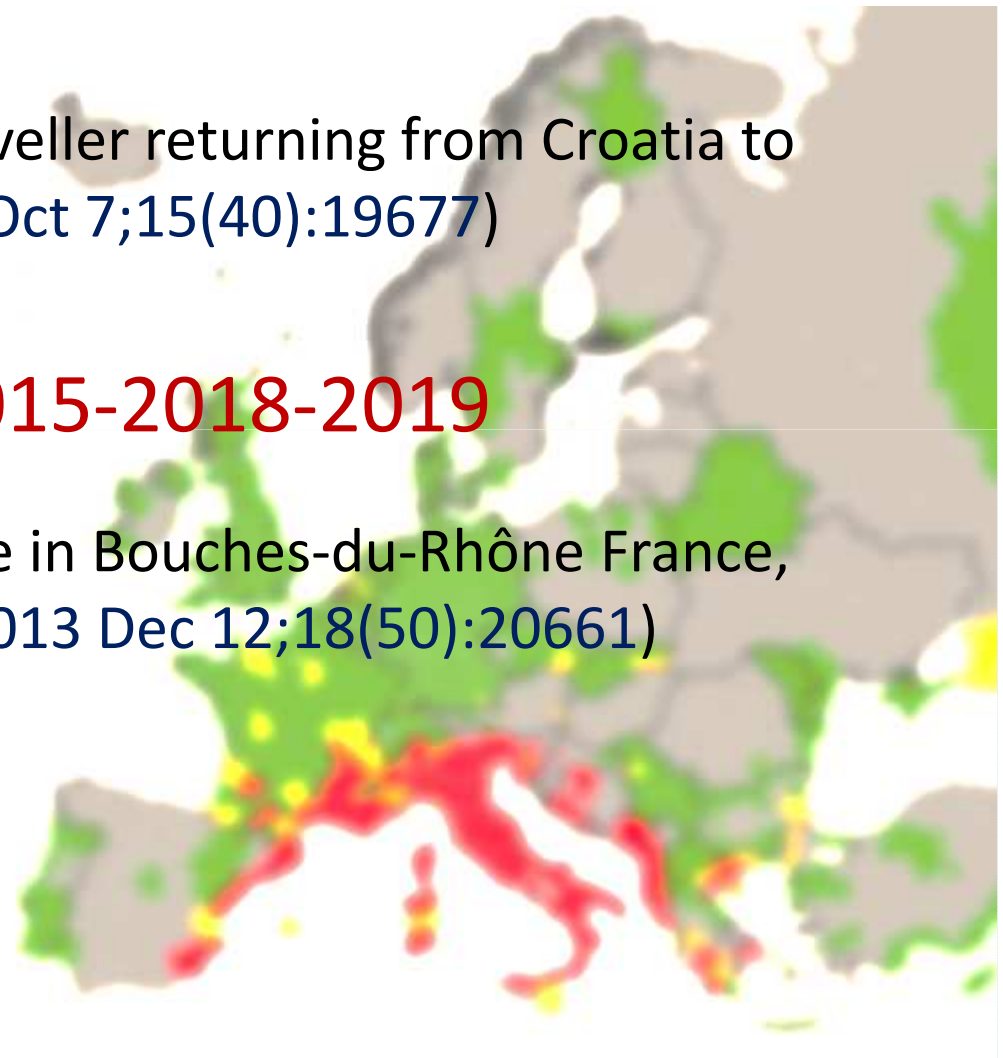
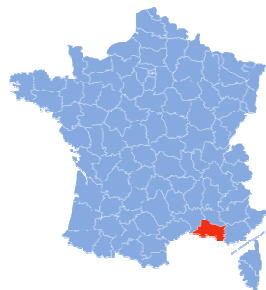


Croatia - October 2010

Dengue virus infection in a traveller returning from Croatia to Germany (Euro Surveill. 2010 Oct 7;15(40):19677)

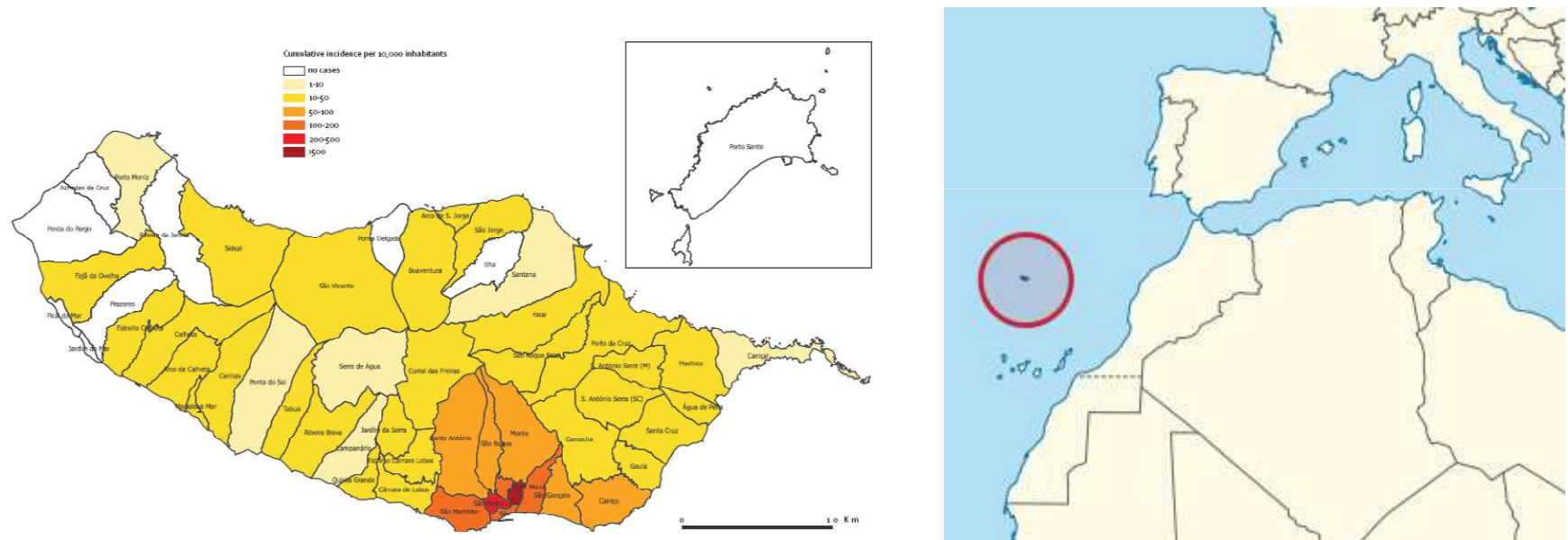
France – 2013-2014-2015-2018-2019

Autochthonous case of dengue in Bouches-du-Rhône France, October 2013 (Euro Surveill. 2013 Dec 12;18(50):20661)



Madeira: Oct. 2012 – Feb. 2013

- Dengue outbreak with 2168 reported cases



- 58 exported cases to other European countries

Diagnosi differenziale

Features	Zika	Dengue	Chikungunya
Fever	++	+++	+++
Rash	+++	+	++
Conjunctivitis	++	-	-
Arthralgia	++	+	+++
Myalgia	+	++	+
Headache	+	++	++
Hemorrhage	-	++	-
Shock	-	+	-

... ma anche: Morbillo, Rosolia, V° malattia, *Streptococcus* B emolitico gruppo A, Leptospirosi, Malaria

CDC. Zika virus-What clinician should know? http://emergency.cdc.gov/coca/ppt/2016/01_26_16_zika.pdf

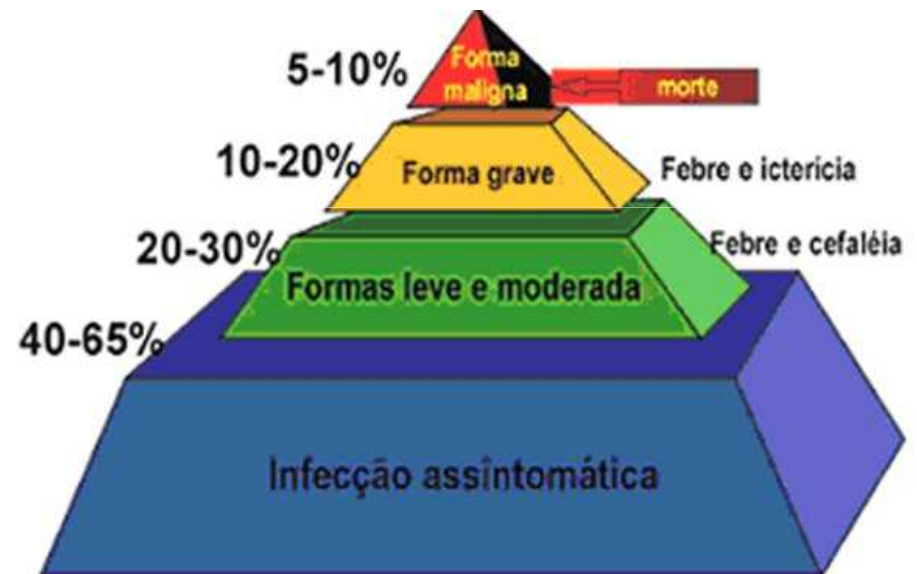
Table 1. Frequency of acute symptoms of CHIKV Infection.^a

Symptom or sign	Frequency range (% of symptomatic patients)
Fever	76–100
Polyarthralgias	71–100
Headache	17–74
Myalgias	46–72
Back pain	34–50
Nausea	50–69
Vomiting	4–59
Rash	28–77
Polyarthrititis	12–32
Conjunctivitis	3–56

Majority
(72-97%) of
infected
persons are
symptomatic

Dengue and **Zika**
80% of infected persons are
asymptomatic !!!!!

Yellow fever



RESEARCH ARTICLE

Open Access

Human and entomological surveillance of West Nile fever, dengue and chikungunya in Veneto Region, Italy, 2010-2012

Federico Gobbi^{1*}, Gioia Capelli², Andrea Angheben¹, Mario Giobbia³, Mario Conforto⁴, Marzia Franzetti⁵, Anna Maria Cattelan⁶, Enzo Rase⁷, Pierangelo Rovere⁸, Paolo Mulatti², Fabrizio Montarsi², Andrea Drago⁹, Luisa Barzon^{10,11}, Giuseppina Napoletano¹², Francesca Zanella¹³, Francesca Pozza¹³, Francesca Russo¹³, Paolo Ruel¹⁴, Giorgia Pali^{10,11}, Zeno Bisnoff¹ and Summer Fever Study Group

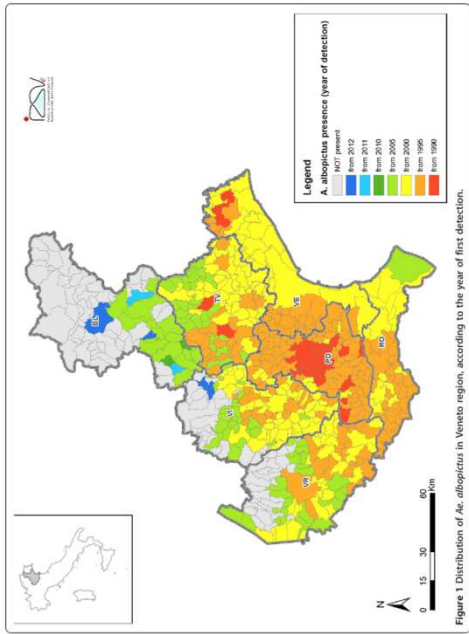


Figure 1 Distribution of *Ae. albopictus* in Veneto region, according to the year of first detection.

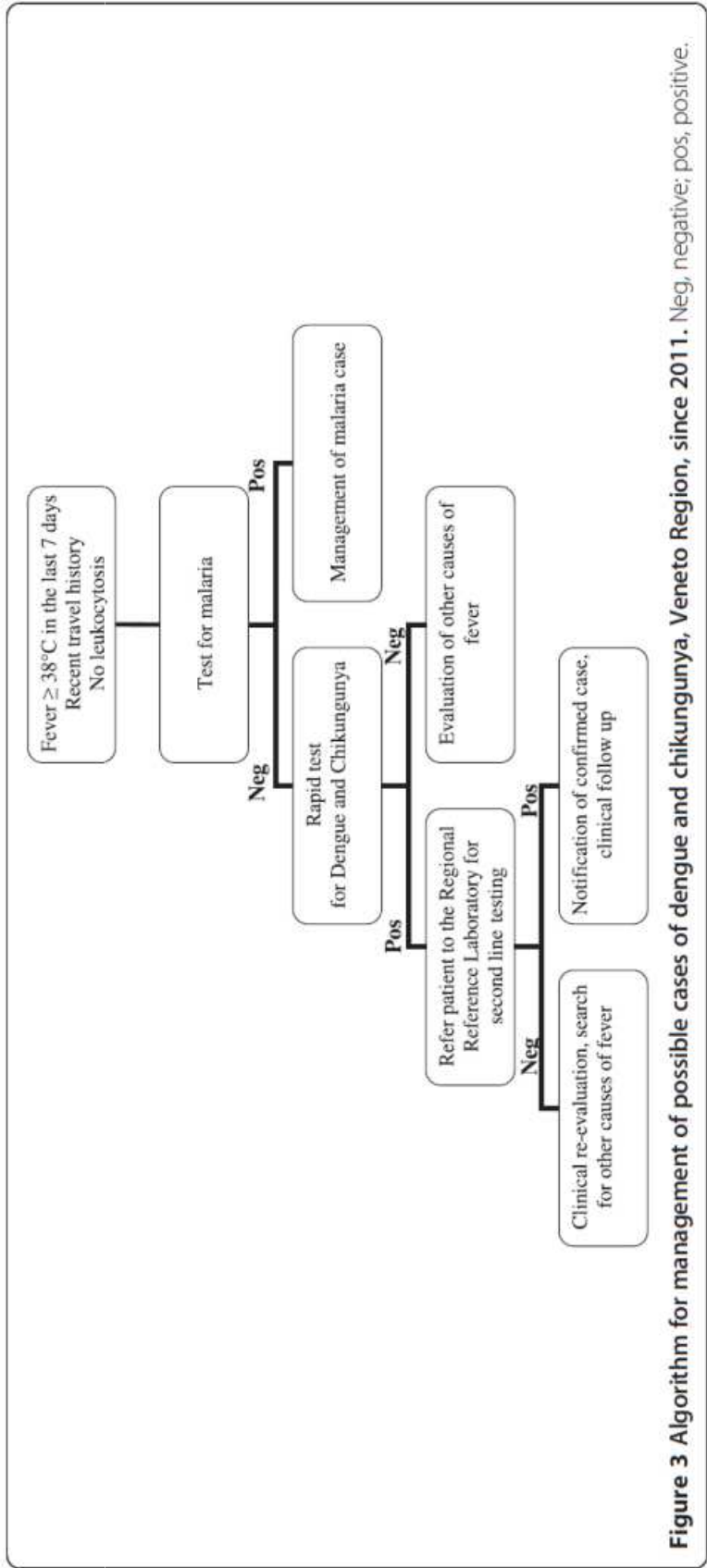
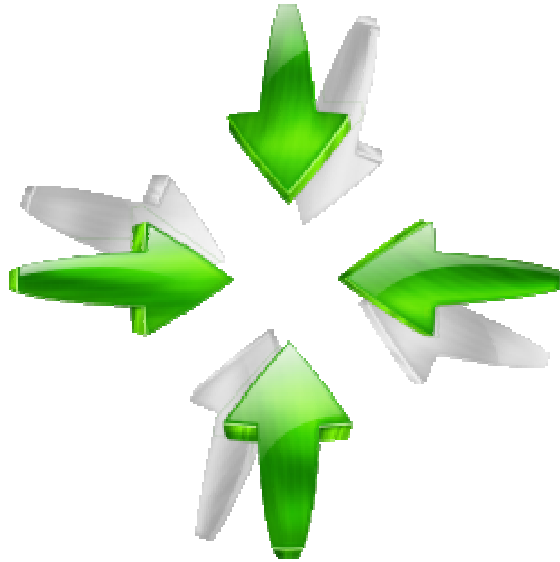
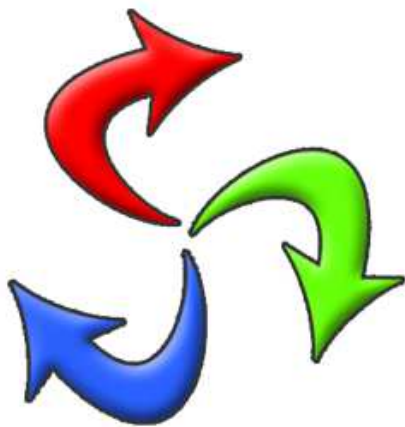


Figure 3 Algorithm for management of possible cases of dengue and chikungunya, Veneto Region, since 2011. Neg, negative; pos, positive.



**Dengue/Zika
Chikungunya**



West Nile Fever

- Test rapidi dengue



- Test rapidi chikungunya e Zika virus



- Dotare reparti di malattie infettive di test rapidi dengue



- Febbri di ritorno dai tropici: codice verde PS



- Molte WNF rimangono non diagnosticate



- Collaborazione con i MMG



- Collaborazione tra Salute pubblica, malattie infettive, Laboratorio di microbiologia, Istituto zooprofilattico



RAPID COMMUNICATION

First autochthonous dengue outbreak in Italy, August 2020

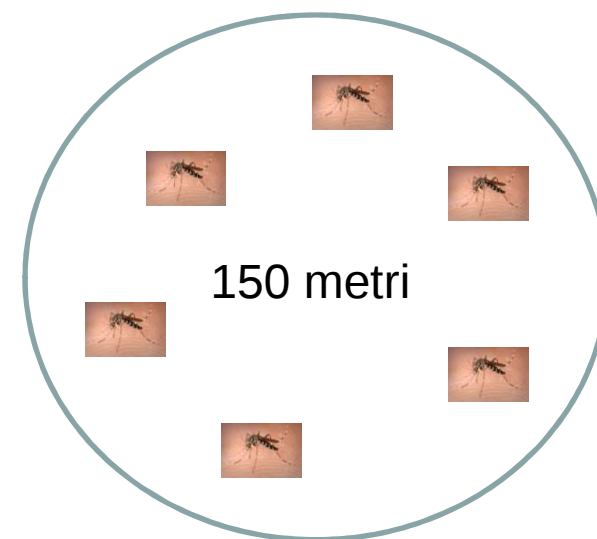
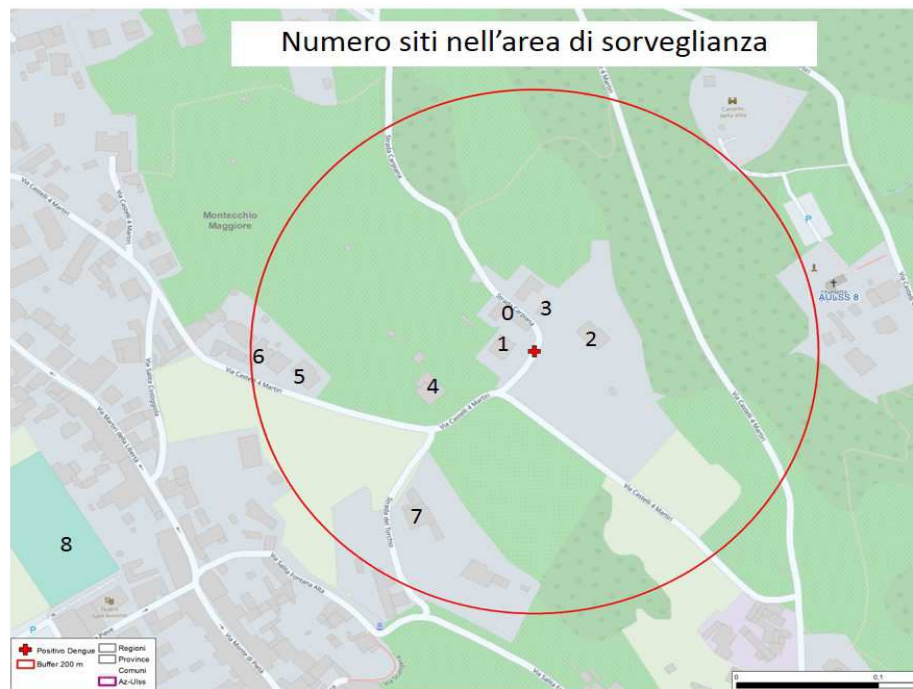
Luca Lazzarini¹, Luisa Barzon^{2,3,4}, Felice Foglia⁵, Vinicio Manfrin¹, Monia Pacenti⁴, Giacomina Pavan⁶, Mario Rassu⁶, Gioia Capelli^{2,7}, Fabrizio Montarsi^{2,7}, Simone Martini^{2,8}, Francesca Zanella^{2,9}, Maria Teresa Padovan⁵, Francesca Russo^{2,9}, Federico Gobbi^{2,10}

TABLE

Clinical and laboratory findings in outbreak (family cluster) of autochthonous dengue, Vicenza Province, Italy, July to August 2020 (n=6)

Clinical, epidemiological and laboratory parameters	Case 1	Case 2	Case 3	Case 4	Case 5	Case 6
Date of symptom onset	30 Jul	16 Aug	16 Aug	16 Aug	18 Aug	18 Aug
Delay between sample collection and onset of symptoms (days)	27	10	6	10	8	8
Symptoms	Fever (38° C), arthralgia, myalgia, headache	Fever (39° C), arthralgia, myalgia, headache	Fever (38° C), arthralgia, upper limb itching	Fever (38° C)	Fever (38.5° C)	Fever (39° C)
Epidemiological link	Source case	Household contact of Case 1	Index case and household contact of Case 1	Household contact of Case 1	Household contact of Case 1	Household contact of Case 1
DENV RNA in blood ^a	Negative	DENV-1	DENV-1	Negative	DENV-1	DENV-1
DENV RNA in urine ^a	Negative	DENV-1	DENV-1	DENV-1	DENV-1	DENV-1
DENV RNA in saliva ^a	Negative	Negative	DENV-1	Negative	DENV-1	DENV-1
DENV NS1 antigen ^b	Negative	Positive	Positive	Negative	Positive	Positive
DENV IgM ^c	Positive	Positive	Negative	Positive	Positive	Positive
DENV IgG ^c	Positive	Negative	Negative	Negative	Negative	Negative

Sorveglianza entomologica





REGIONE DEL VENETO

BOLLETTINO SORVEGLIANZA DELLE ARBOVIROSI - ANNO 2020
N.3 DEL 28/08/2020

U.O. PREVENZIONE E SANITÀ PUBBLICA
DIREZIONE PREVENZIONE, SICUREZZA ALIMENTARE, VETERINARIA
AREA SANITÀ E SOCIALE | REGIONE DEL VENETO

SORVEGLIANZA DELLE ARBOVIROSI ANNO 2020

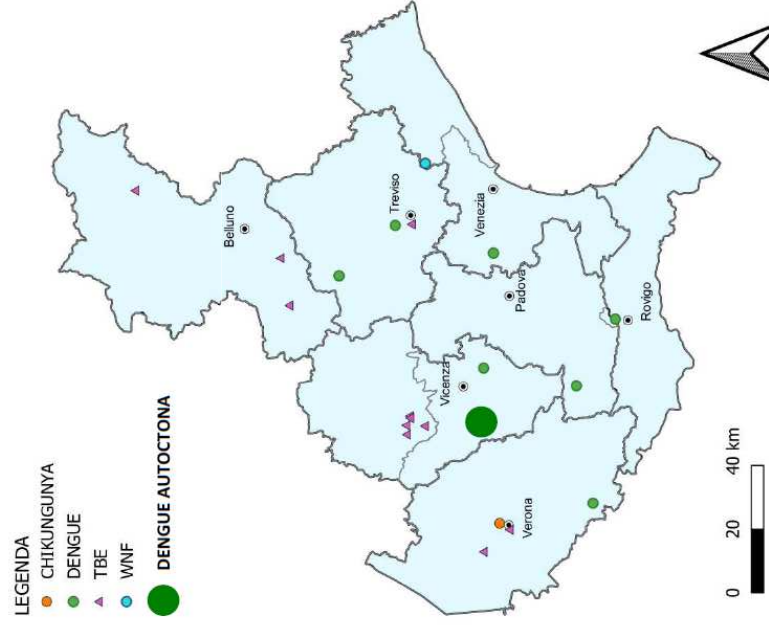


Fig. 1 - Distribuzione geografica dei casi di malattia nell'uomo per infezione da arbovirus (residenti in Veneto)

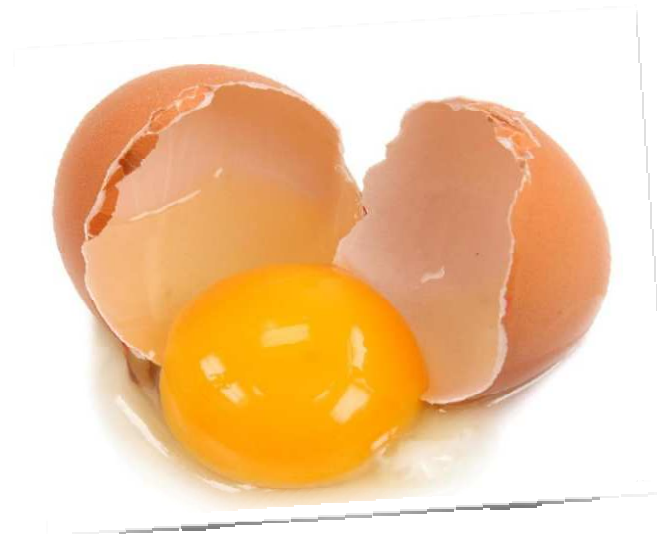
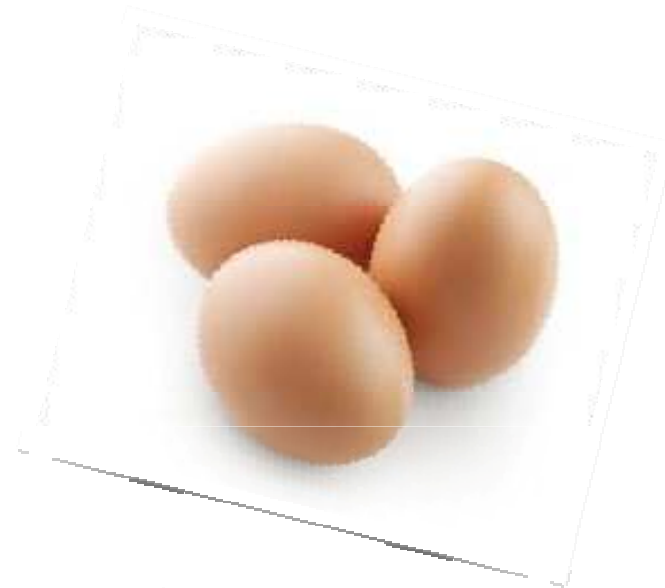
Risultati della sorveglianza febbri estive, 2010-2019

Anno	Dengue	CHIKV	%	Zika	WNF	%	WNND
2008	2	1			1		5
2009	4	0			0		7
2010*	14/79	1/79	(15/79) 18.9		4/38	10.5	3
2011	3/29	0/29	(3/29) 10.3		3/51	5.8	10
2012	7/126	2/126	(9/126) 7.1		17/319	5.3	21
2013	14/203	0/203	(14/203) 6.9		16/330	4.8	15
2014	11/113	13/133	(24/133)1 8.0		1/185	0.5	1
2015	17/131	7/128	(24/131)1 8.7		1/300	0.3	1
2016	15/115	4/129	(19/129)1 4.7	15/129 11.6	13/195	6.6	3
2017	18/198 (9,0%)	1/267 (0,3%)		4/214 (1,8%)	10/347		7
2018	25	2		1	246		62
2019	47	5		1	37		11

Tab. 1 - Numero di casi totali di malattia nell'uomo per arbovirusi al 28/08/2020.

ARBOVIRUS	N.
CHIKUNGUNYA	1
DENGUE	9
CLUSTER DENGUE AUTOCTONO	5
ZIKA	0
TICK-BORNE ENCEPHALITIS	12
WEST NILE FEVER	1
WEST-NILE WNND	0
USUTU	0

The Surveillance.....



[illegible]