Mosquito borne diseases

National Center for Global Health and Medicine
Disease Control and Prevention Center
Satoshi KUTSUNA, M.D., Ph.D.

10/18/2017

The Workshop for the Infection Prevention and Control,
Antimicrobial Resistance Emerging Infectious Diseases, Antimicrobial Resistance

World's Deadliest Animals

Number of humans killed by animals, 2015

gates notes

8,000 **Kissing bug**

3,500 **Tsetse fly**

1,600 **Tapeworm**

100 **Lion**

60,000 **Snake**

830,000 **Mosquito**

dengue infections in a world per year

3.9millions

Nature. 2013 Apr 25;496(7446):504-7.

Mosquitoes run
the way far ahead of
humans

CDC A-Z INDEX

EMERGING INFECTIOUS DISEASES®

ISSN: 1080-6059

Volume 23, Number 8—August 2017

Research Letter

Early Evidence for Zika Virus Circulation among *Aedes aegypti* Mosquitoes, Rio de Janeiro, Brazil

Tania Ayllón, Renata de Mendonça Campos, Patrícia Brasil, Fernanda Cristina Morone, Daniel Cardoso Portela Câmara, Guilherme Louzada Silva Meira, Egbert Tannich, Kristie Aimi Yamamoto, Marilia Sá Carvalho, Renata Saraiva Pedro, Jonas Schmidt-Chanasit, Daniel Cadar, Davis Fernandes Ferreira, and Nildimar Alves Honório

Author affiliations: Instituto Nacional de Infectologia Evandro Chagas–Fiocruz, Rio de Janeiro, Brazil (T. Ayllón, P. Brasil, R.S. Pedro); Núcleo Operacional Sentinela de Mosquitos

On This Page

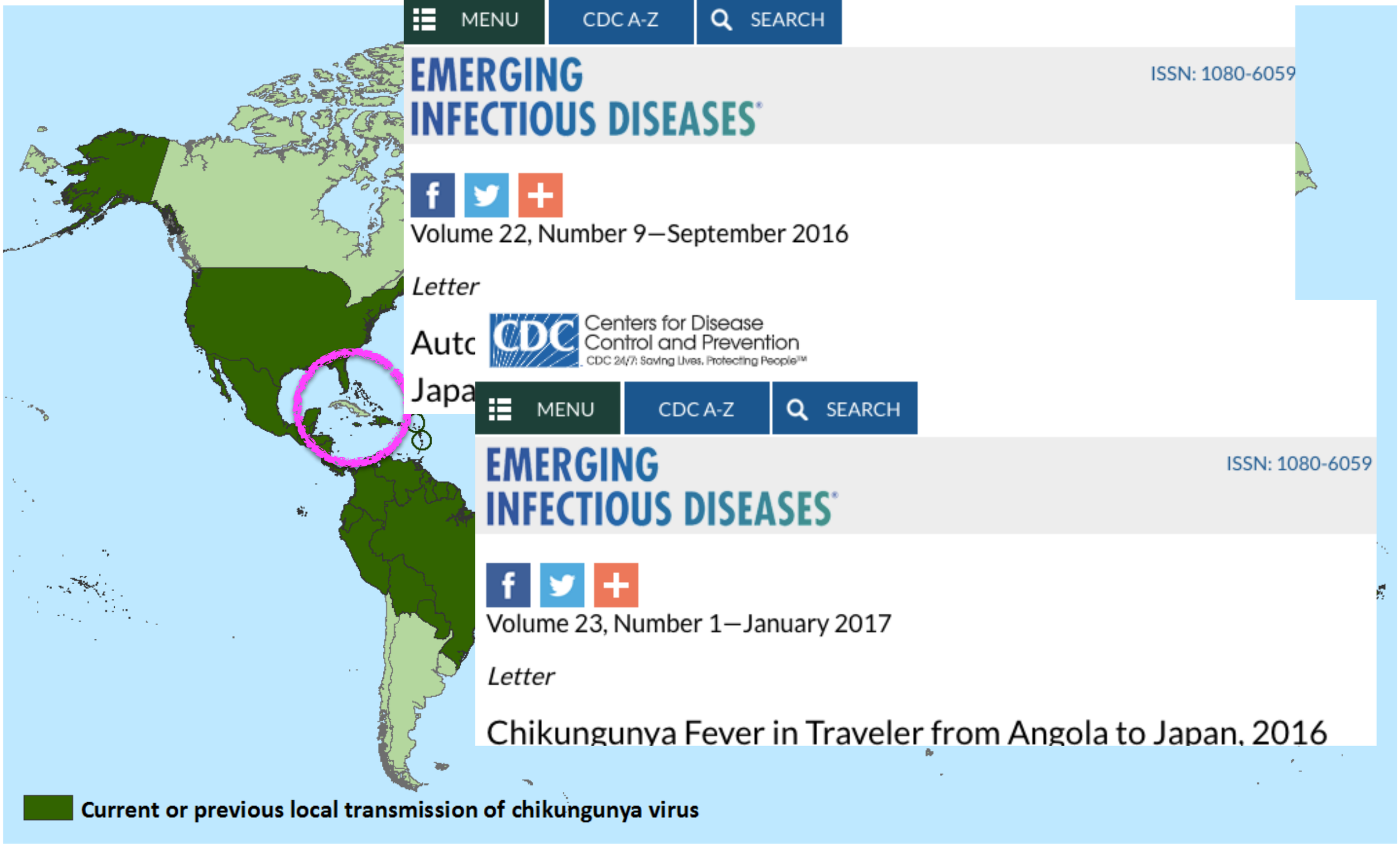
Research Letter

Cite This Article

First human ZIKA cases in Brazil: 2015

First ZIKV detected from mosquitoes in Brazil ：March-Nov 2013

Endemic



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Letter

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EMERGING INFECTIOUS DISEASES®

ISSN: 1080-6059

Volume 23, Number 1—January 2017

Letter

Chikungunya Fever in Traveler from Angola to Japan, 2016

http://www.cdc.gov/chikungunya/pdfs/chikungunyaworldmap_10-20-2015.pdf

Autochthonous dengue virus infection in Japan imported into Germany, September 2013

J Schmidt-Chanasit (jonassi@gmx.de)[1,2], P Emmerich[1], D Tappe[1], S Günther[1], S Schmidt[3], D Wolff[3], K Hentschel[4], D Sagebiel[4], I Schöneberg[5], K Stark[5], C Frank[5]

1. Bernhard Nocht Institute for Tropical Medicine, WHO Collaborating Centre for Arbovirus and Haemorrhagic Fever Reference and Research, Hamburg, Germany
2. German Centre for Infection Research (DZIF), partner site Hamburg-Luebeck-Borstel, Hamburg, Germany
3. Public Health Authority Steglitz-Zehlendorf, Berlin, Germany
4. State Office of Health and Social Affairs, Berlin, Germany
5. Robert Koch Institute, Department for Infectious Disease Epidemiology, Division of Gastrointestinal Infections, Zoonoses and Tropical Infections, Berlin, Germany

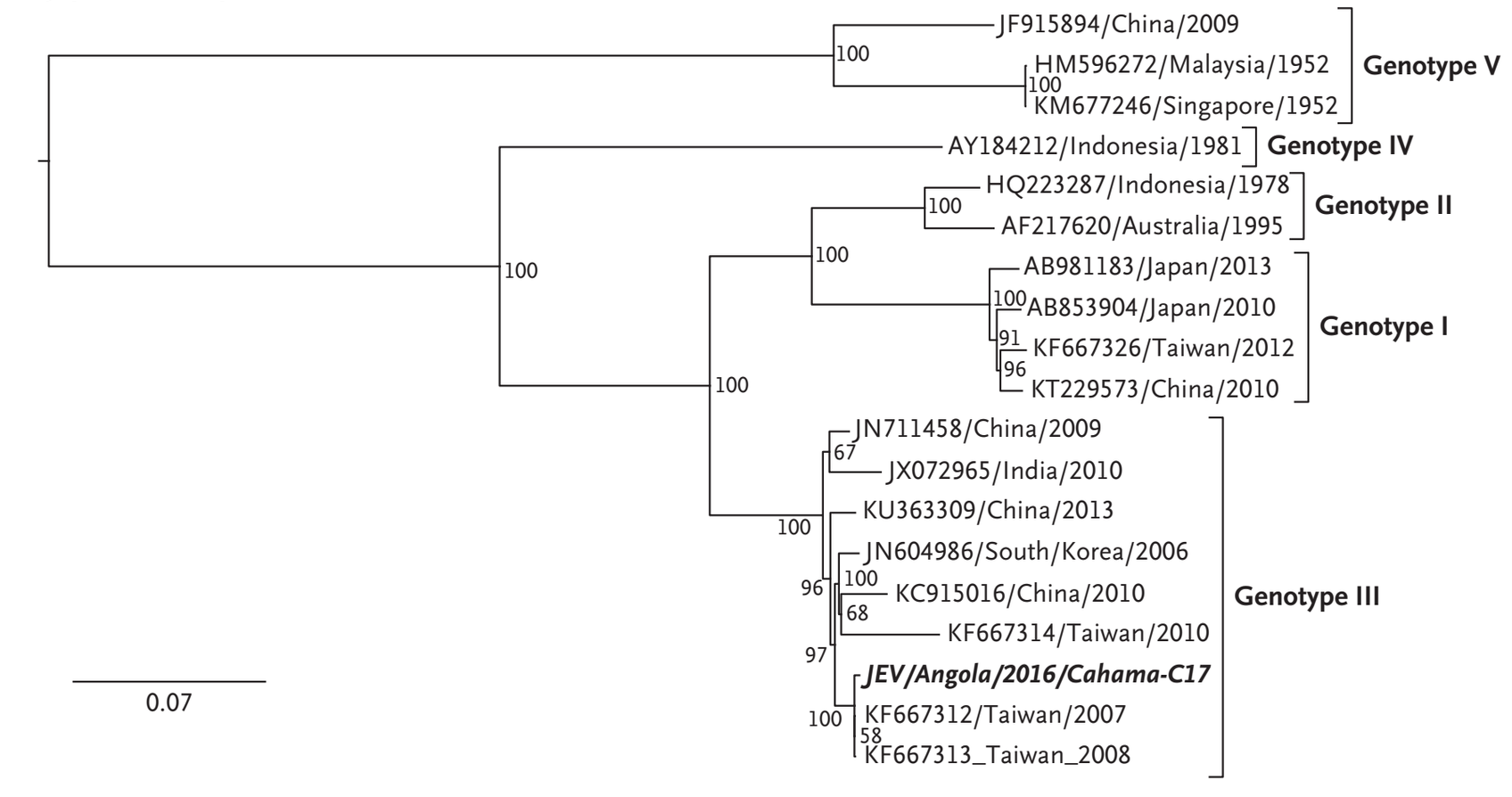
Citation style for this article:
Schmidt-Chanasit J, Emmerich P, Tappe D, Günther S, Schmidt S, Wolff D, Hentschel K, Sagebiel D, Schöneberg I, Stark K, Frank C. Autochthonous dengue virus infection in Japan imported into Germany, September 2013. Euro Surveill. 2014;19(3):pii=20681. Available online: http://www.eurosurveillance.org/ViewArticle.aspx?ArticleId=20681

Article submitted on 18 January 2014 / published on 23 January 2014

1 year before the autochthonous outbreak in Japan

CORRESPONDENCE

Autochthonous Japanese Encephalitis with Yellow Fever Coinfection in Africa



N Engl J Med. 2017 Apr 13;376(15):1483-1485.

Background of increasing mosquito-borne diseases

ease affecting humans.

available.

Climate and transportation

Travel, trade and climate change influence mosquito and disease distribution

99% of all malaria cases in Europe are **travel-related.**

More than 5.8 million travellers entered Europe from **dengue-affected** areas in 2010.

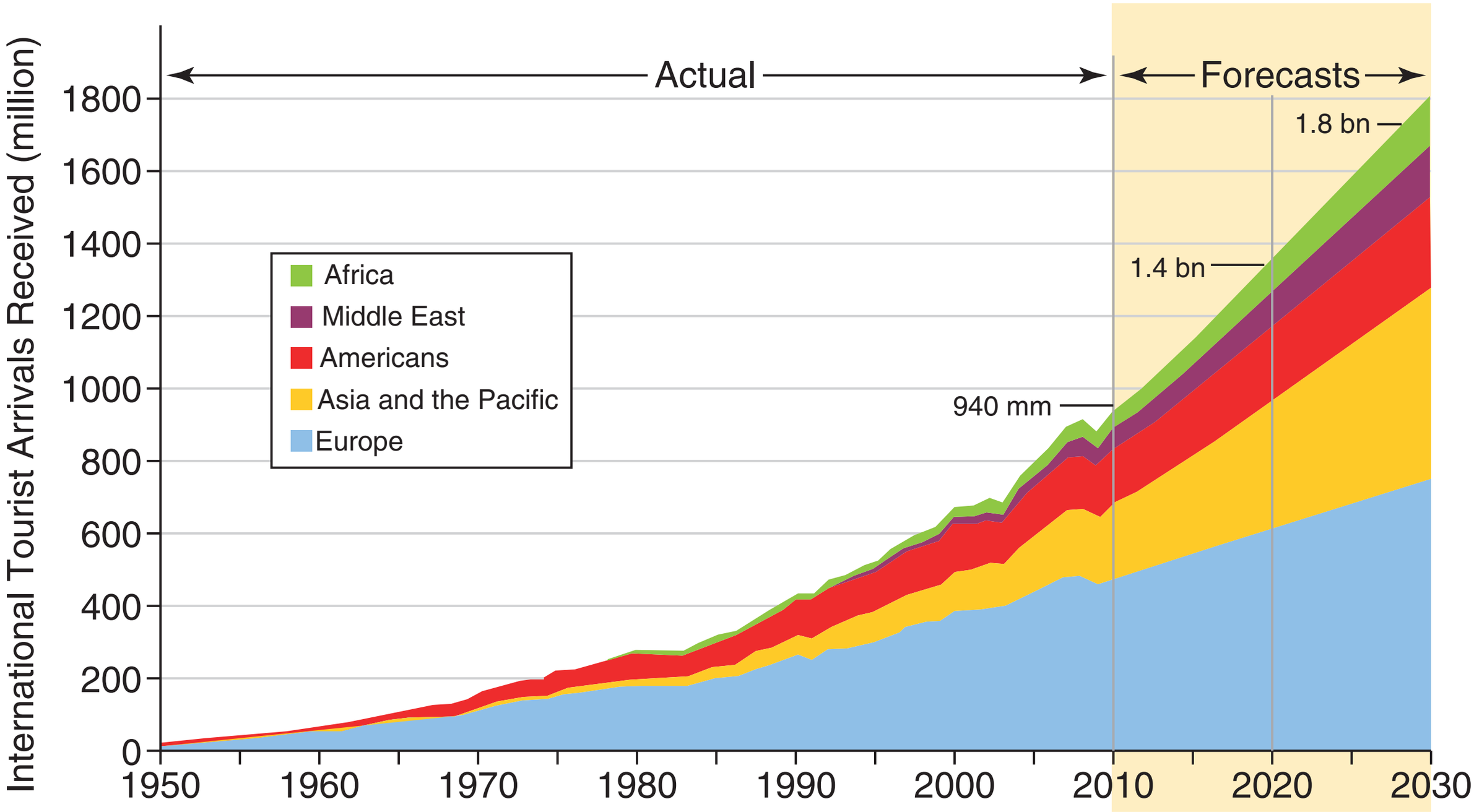
Ae. albopictus has moved from continent to continent **via trade.**

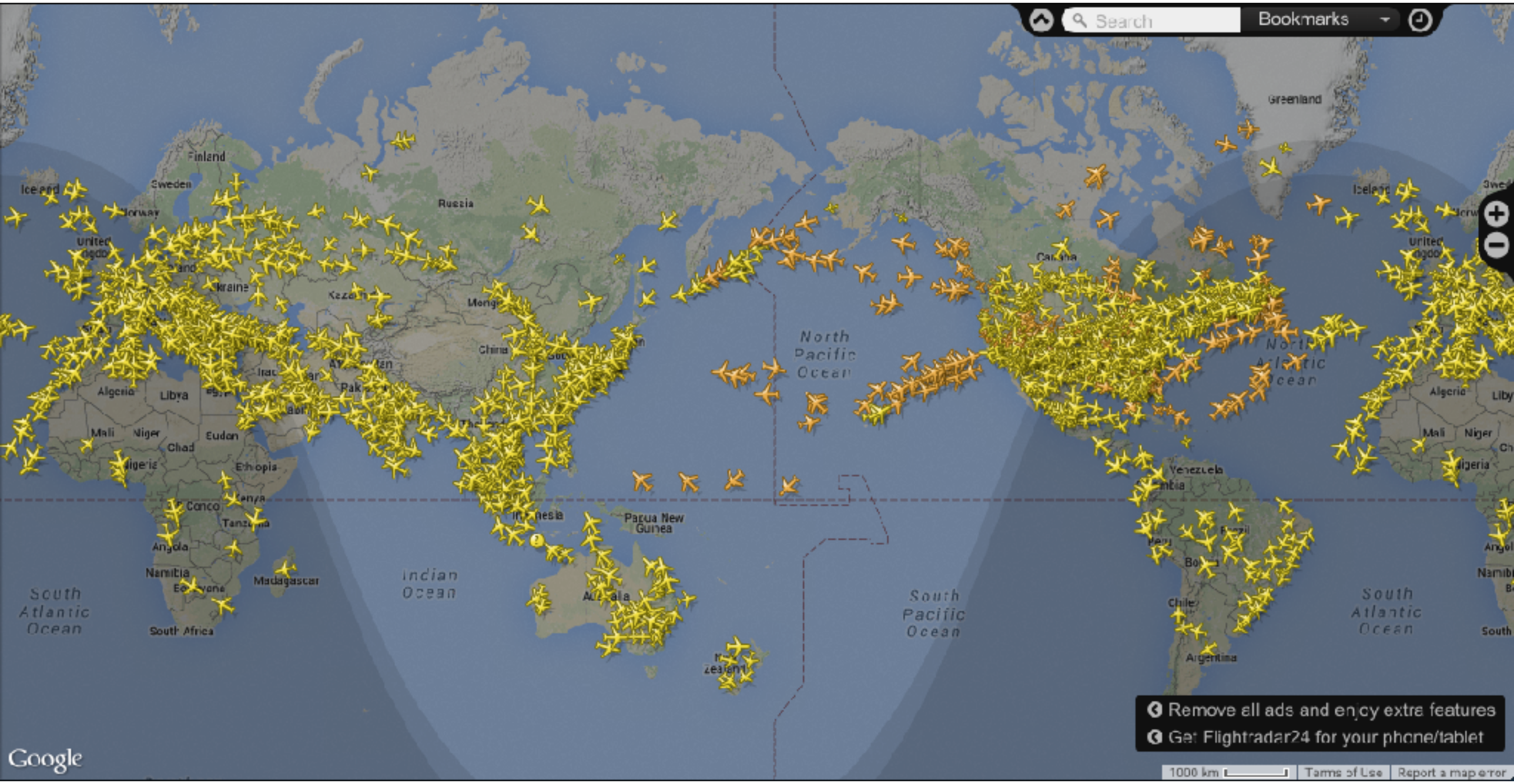
It is predicted that future **climate trends** will increase the risk of establishment of *Aedes albopictus* in northern Europe, due to wetter and **warmer conditions.**

Rising temperatures in the summer months can contribute to West Nile fever **affecting new areas** in Europe.

https://ecdc.europa.eu/en/publications-data/mosquito-borne-diseases-emerging-threat

International Travelers

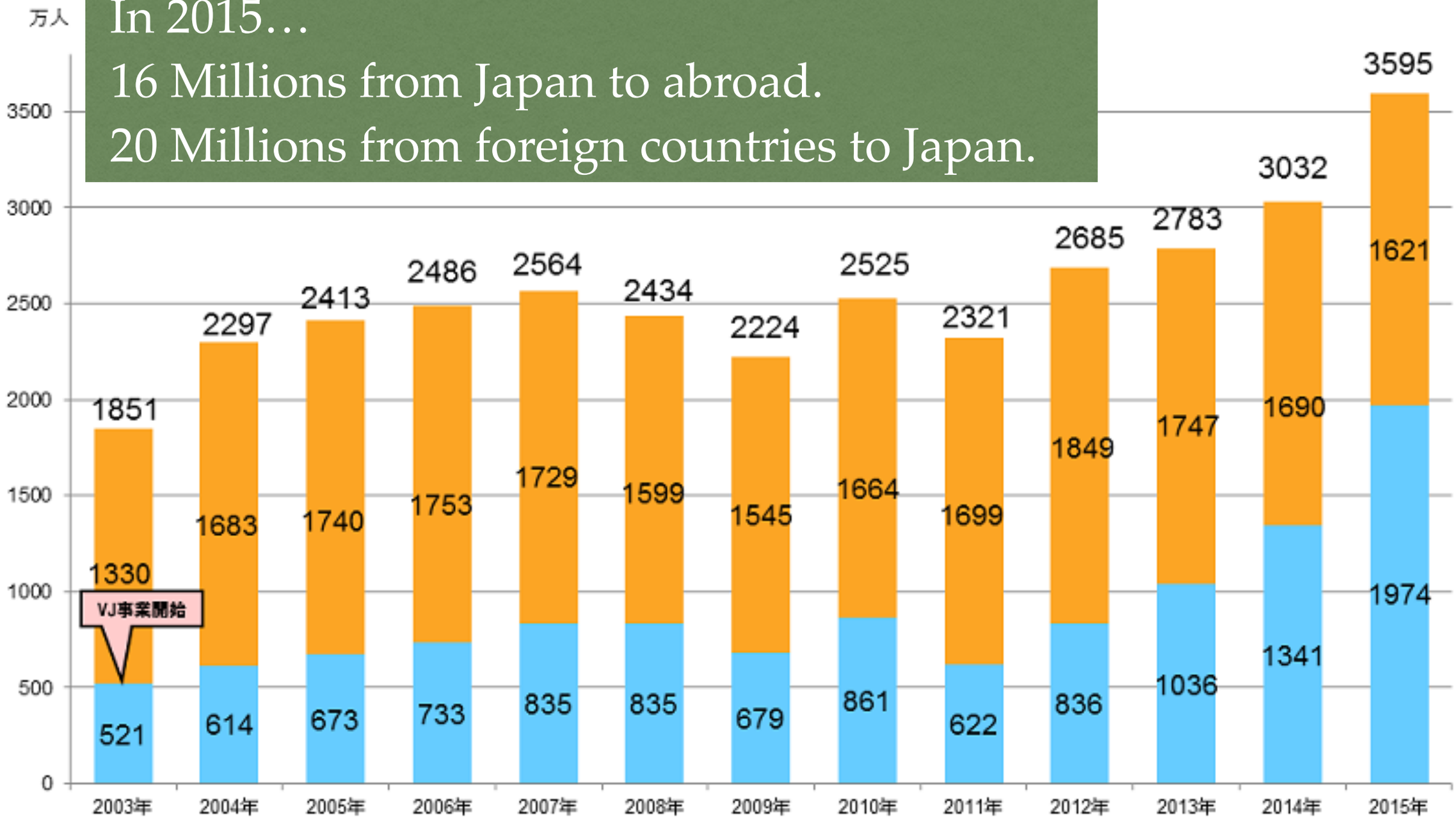




http://www.flightradar24.com/

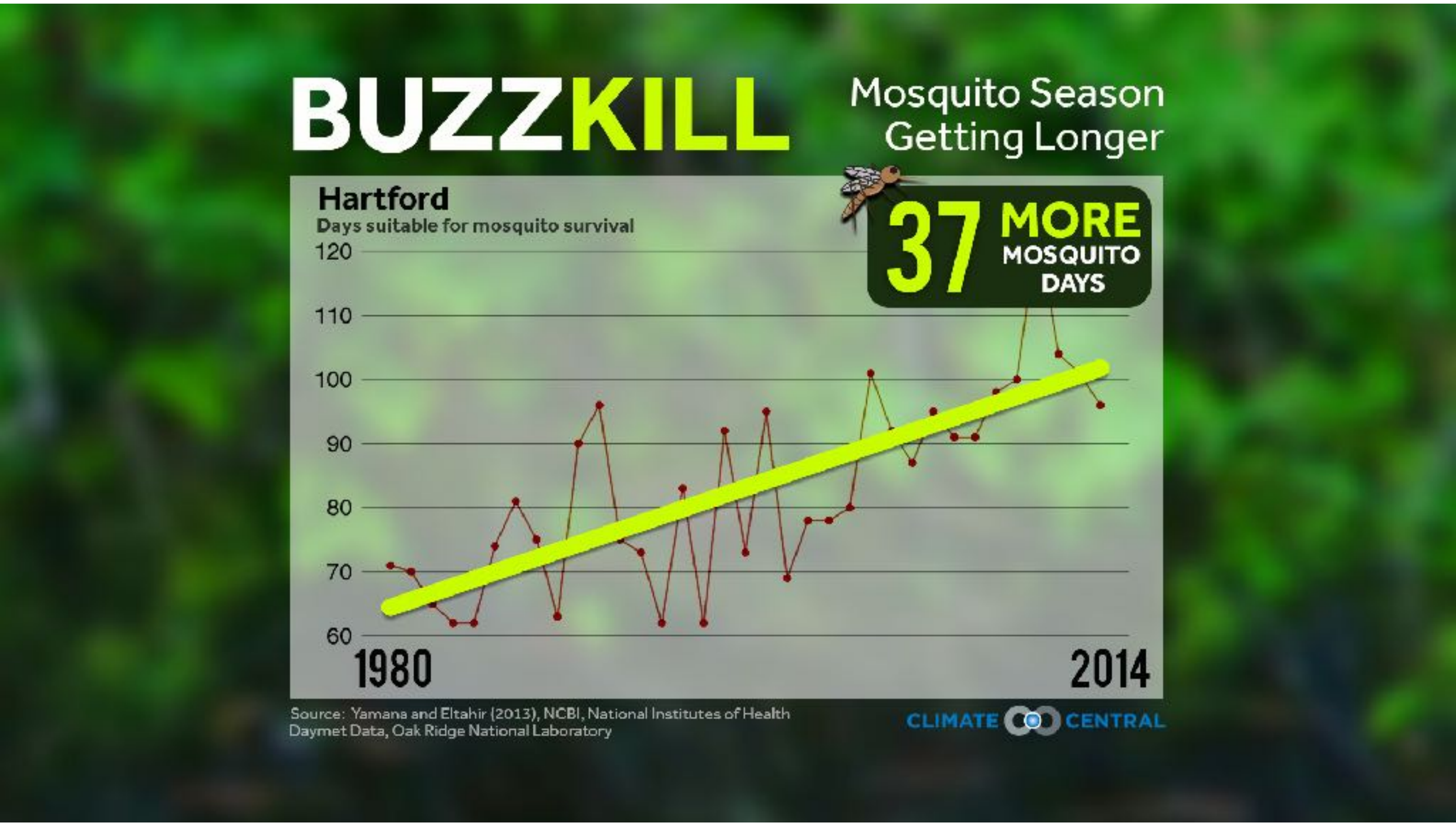
Globalization of Japan

In 2015…
16 Millions from Japan to abroad.
20 Millions from foreign countries to Japan.

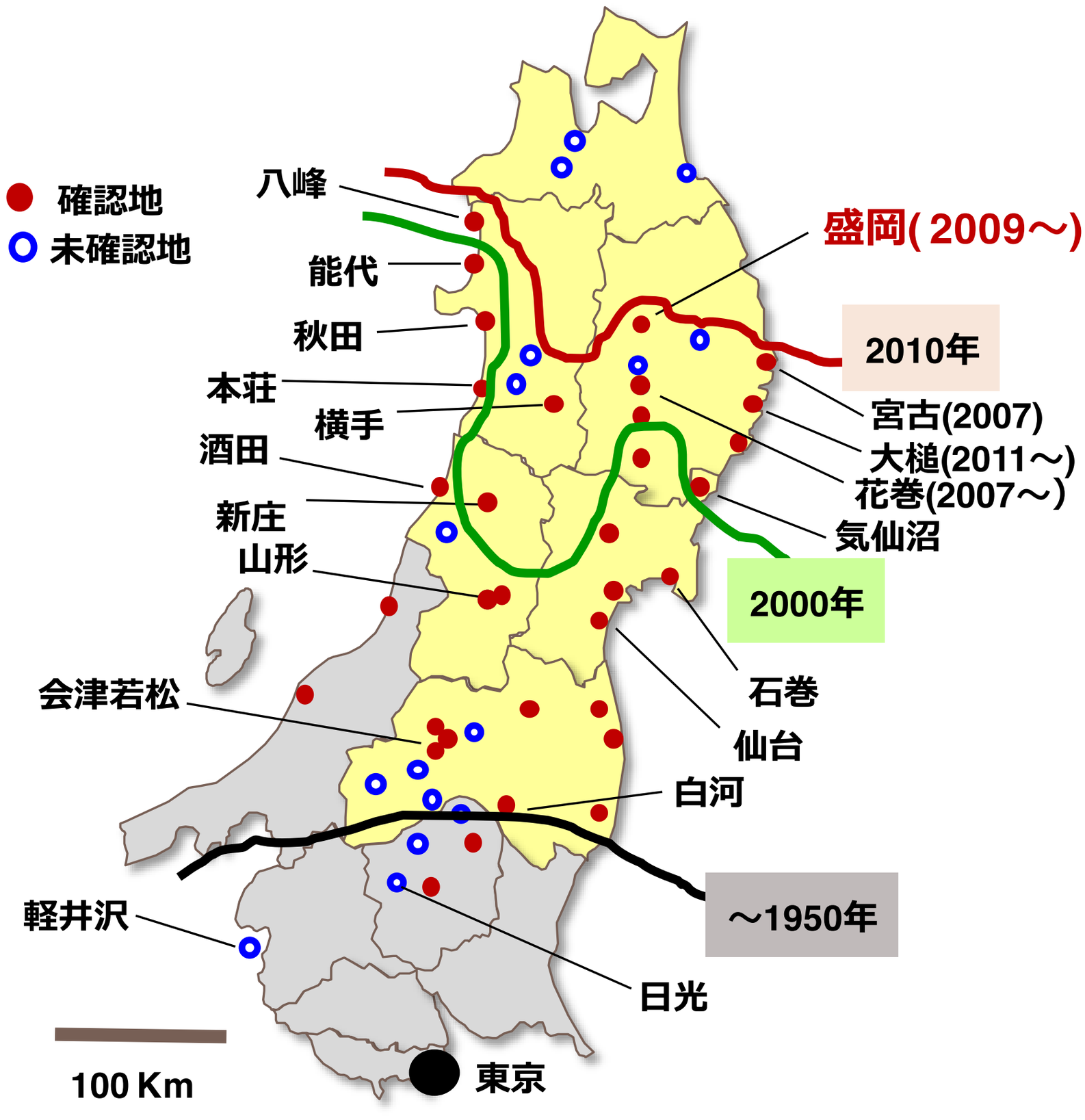


より

WARMING



http://www.climatecentral.org/news/what-warming-means-summers-pests-19295


確認地
未確認地
八峰
能代
秋田
本荘
横手
酒田
新庄
山形
会津若松
軽井沢
盛岡(2009～)
2010年
宮古(2007)
大槌(2011～)
花巻(2007～)
気仙沼
2000年
石巻
仙台
白河
～1950年
日光
東京
100 Km

URBANIZATION

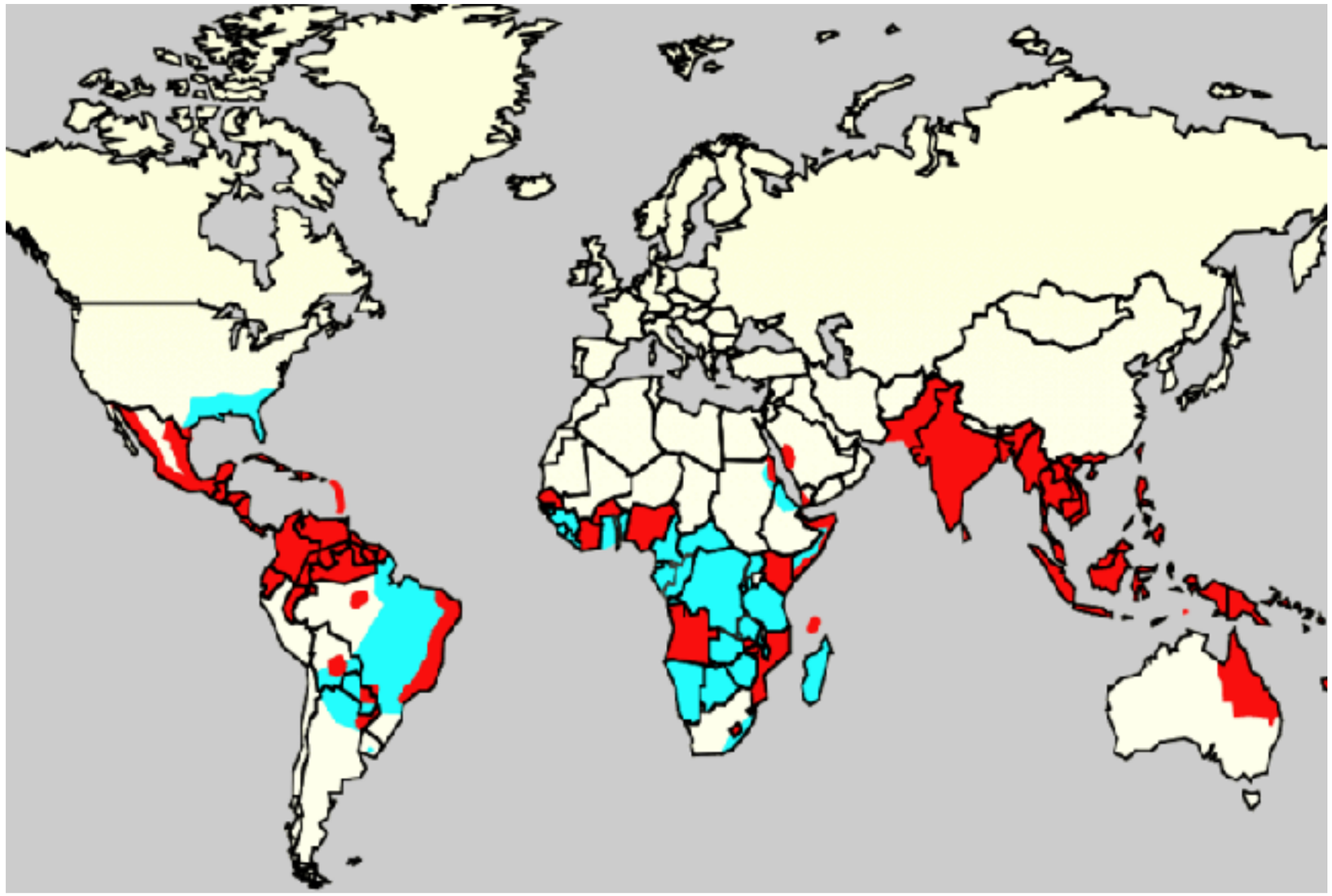
Kinds of mosquitos and infectious diseases

			
Kinds of Mosquitos	*Culex*	*Aedes*	*Anopheles*
infectious diseases	Japanese Encephalitis West Nile Fever	**Dengue Fever** **Chikungunya Fever** **Zika Virus Infection** **Yellow fever**	Malaria Filariasis

Jong Travel and Tropical Medicine Manual, 4th ed.を参考に作成

Aedes aegypti

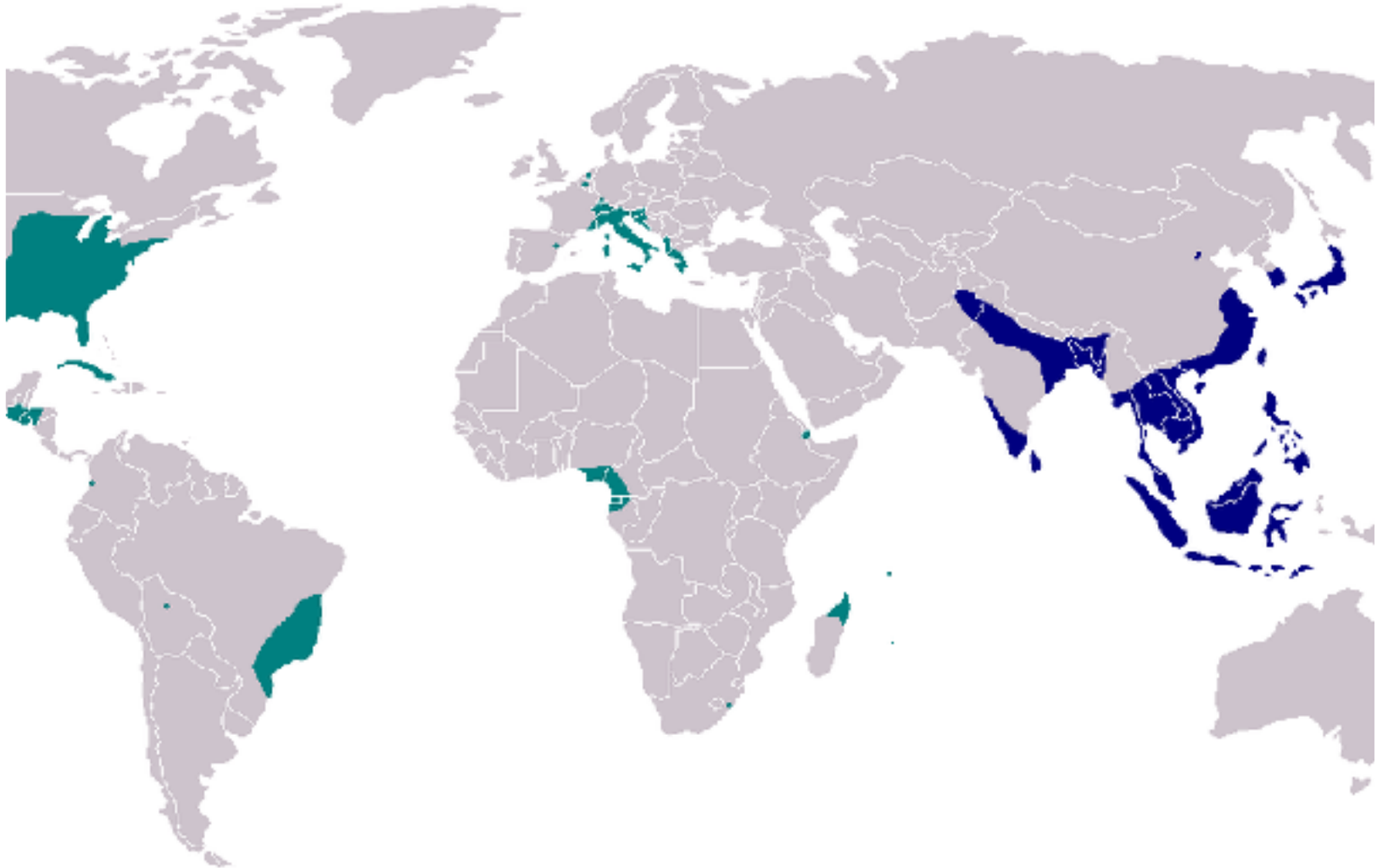
- Main vector for DENV, CHIKV, ZIKV
- Distributed in tropical and subtropic regions
- In Japan: not distributed



IASR Vol.28 p 219-221

Aedes albopictus

- Second vector for DENV, CHIKV, ZIKV
- Distributed in Southeast Asia, East Asia
- Now distributed in American continent, and part of Europe.



ヒトスジシマカの生態と東北地方における分布域の拡大 (IASR Vol. 32 p. 167-168: 2011年6月号)

国立感染症研究所　デング熱国内感染事例発生時の対応・対策の手引き

2014

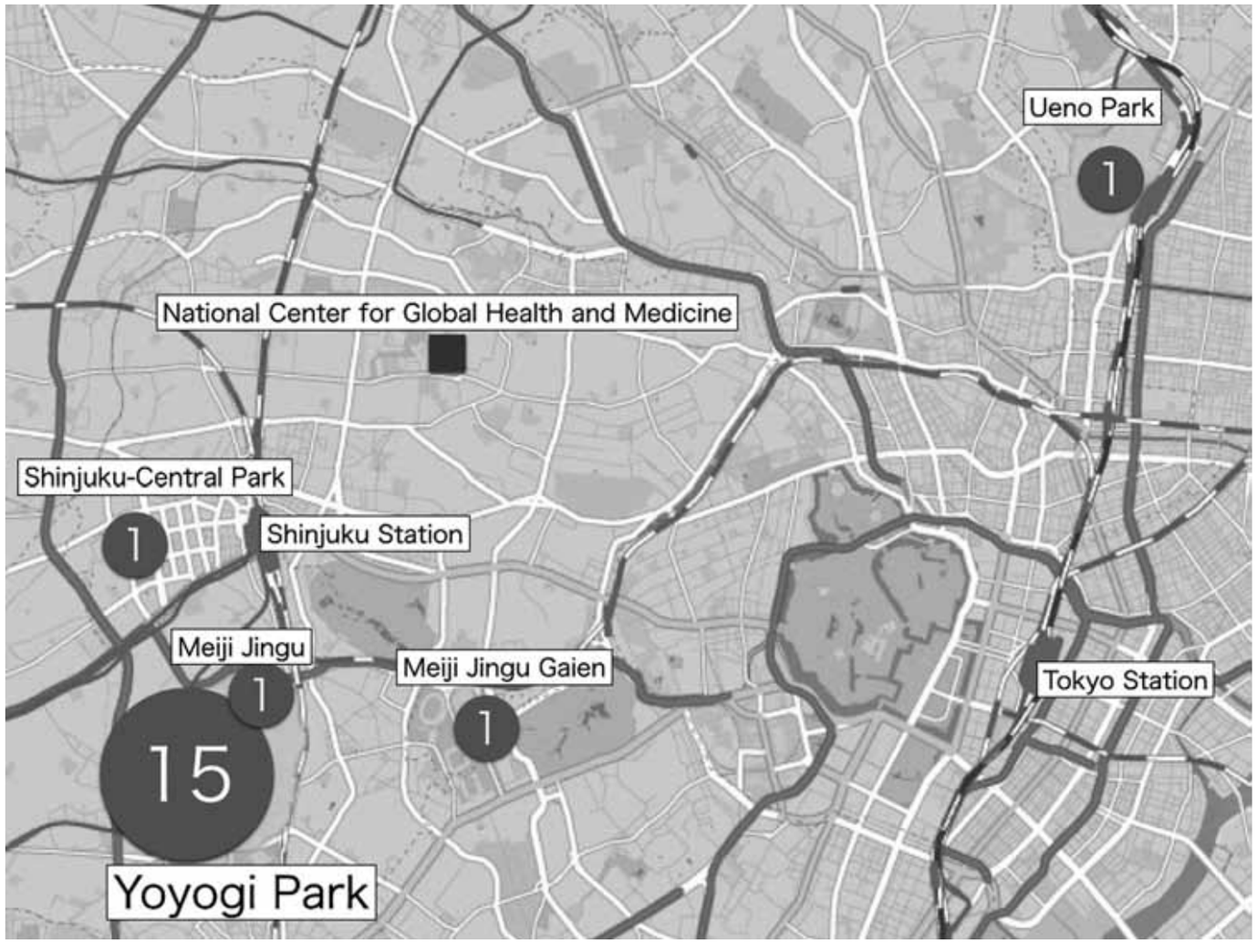
Dengue fever in Japan

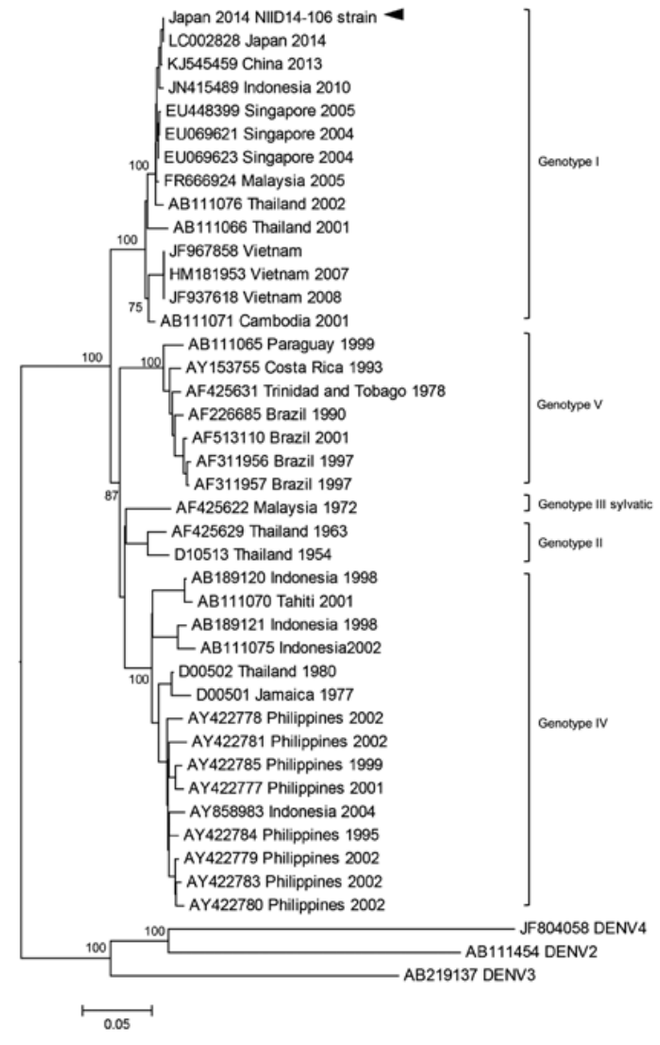
Autochthonous Dengue Fever, Tokyo, Japan, 2014

Satoshi Kutsuna, Yasuyuki Kato, Meng Ling Moi, Akira Kotaki, Masayuki Ota, Koh Shinohara, Tetsuro Kobayashi, Kei Yamamoto, Yoshihiro Fujiya, Momoko Mawatari, Tastuya Sato, Junwa Kunimatsu, Nozomi Takeshita, Kayoko Hayakawa, Shuzo Kanagawa, Tomohiko Takasaki, Norio Ohmagari

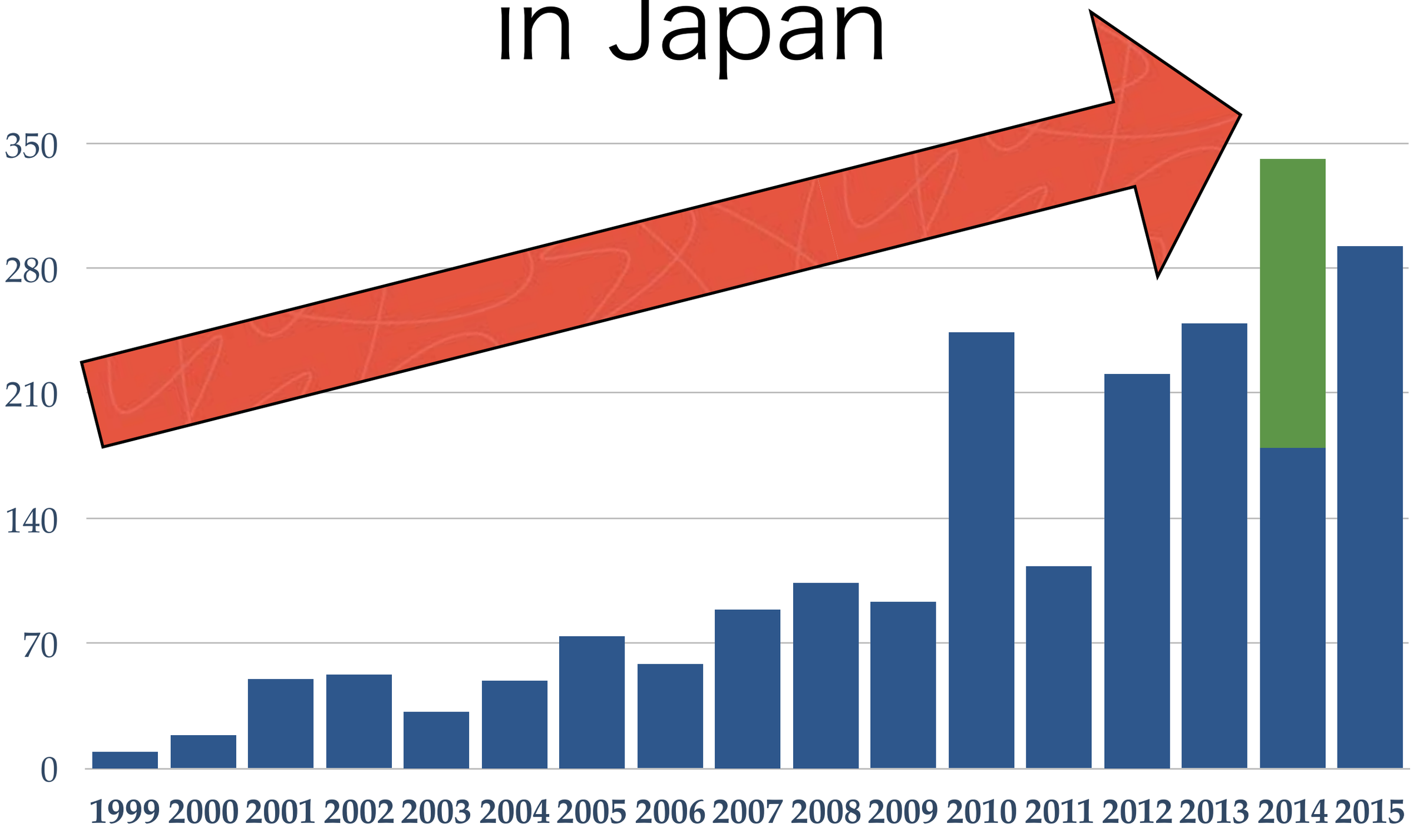
history of having contracted dengue fever while in the Philippines in 2006. None of the patients had traveled overseas during the 3 months before the outbreak of dengue virus type 1 (DENV-1) in Japan.

Places of exposures were assessed for all patients; 15 patients had recently visited Yoyogi Park and were bitten by mosquitoes while there; the remaining 4 patients had visited Shinjuku Central Park, Meiji Jingu Shrine, Meiji-





Reported cases of DF in Japan



http://www.niid.go.jp/niid/ja/all-surveillance/2085-idwr/ydata/4405-report-ja2012.html

Yoyogi Park

Located in Shibuya-ku.

Always crowded

Many Mosquitoes


Ueno Park
1
National Center for Global Health and Medicine
Shinjuku-Central Park
1
Shinjuku Station
Meiji Jingu
1
Meiji Jingu Gaien
1
15
Yoyogi Park
Tokyo Station

New Big Problem


au 4G
6:55
83%
都立戸山公園
ジムレベル 2
2000 / 4000
Kutsunax
カイリュー
CP 3009
ジムへもっと近づいてください


au
10:01
79%
CP3232
カイリュー
146 / 146 HP
XS
41.05kg
重さ
ドラゴン / ひこう
2.4m
高さ
160444
ほしのすな
88
ミニリュウのアメ
強化
7000
8
りゅうのいぶき
りゅうのはどう
65

EMERGING INFECTIOUS DISEASES®
ISSN: 1080-6059

Volume 23, Number 10—October 2017

Research Letter

Dengue Virus Exported from Côte d'Ivoire to Japan, June 2017

Identification of dengue type 2 virus in febrile travellers returning from Burkina Faso to France, related to an ongoing outbreak, October to November 2016

C Eldin [1] , P Gautret [1] , A Nougairede [2] , M Sentis [1] , L Ninove [2] , N Saidani [1] , M Million [1] , P Brouqui [1] , R Charrel [2] , P Parola [1]
1. URMITE, Aix Marseille Université (UM63, CNRS 7278, IRD 198, INSERM 1095, IHU - Méditerranée Infection), Marseille, France
2. UMR 'Emergence des Pathologies Virales' (EPV: Aix-Marseille Univ - IRD 190 - Inserm 1207 - EHESP), Marseille, France

Correspondence: Carole Eldin (carole.eldin@gmail.com)

Citation style for this article:
Eldin C, Gautret P, Nougairede A, Sentis M, Ninove L, Saidani N, Million M, Brouqui P, Charrel R, Parola P. Identification of dengue type 2 virus in febrile travellers returning from Burkina Faso to France, related to an ongoing outbreak, October to November 2016. Euro Surveill. 2016;21(50):pii=30425. DOI: http://dx.doi.org/10.2807/1560-7917.ES.2016.21.50.30425

Article submitted on 03 December 2016 / accepted on 15 December 2016 / published on 15 December 2016

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ISSN: 1080-6059

Volume 23, Number 11—November 2017

Research Letter

Dengue Virus Type 2 in Travelers Returning to Japan from Sri Lanka, 2017

Motoyuki Tsuboi, Satoshi Kutsuna, Takahiro Maeki, Satoshi Taniguchi, Shigeru Tajima, Fumihiro Kato, Chang-Kweng Lim, Masayuki Saijo, Saho Takaya, Yuichi Katanami, Yasuyuki Kato, and Norio Ohmagari

Author affiliations: National Center for Global Health and Medicine, Tokyo, Japan (M. Tsuboi, S. Kutsuna, S. Takaya, Y. Katanami, Y. Kato, N. Ohmagari); National Institute of Infectious Diseases, Tokyo (T. Maeki, S. Taniguchi, S. Tajima, F. Kato, C.-K. Lim, M. Saijo)

Suggested citation for this article

The NEW ENGLAND JOURNAL of MEDICINE

ESTABLISHED IN 1812 JANUARY 8, 2015 VOL. 372 NO. 2

Efficacy of a Tetravalent Dengue Vaccine in Children in Latin America

Luis Villar, M.D., Gustavo Horacio Dayan, M.D., José Luis Arredondo-García, M.D., Doris Maribel Rivera, M.D., Rivaldo Cunha, M.D., Carmen Deseda, M.D., Humberto Reynales, M.D., Maria Selma Costa, M.D., Javier Osvaldo Morales-Ramírez, M.D., Gabriel Carrasquilla, M.D., Luis Carlos Rey, M.D., Reynaldo Dietze, M.D., Kleber Luz, M.D., Enrique Rivas, M.D., Maria Consuelo Miranda Montoya, M.D., Margarita Cortés Supelano, M.D., Betzana Zambrano, M.D., Edith Langevin, M.Sc., Mark Boaz, Ph.D., Nadia Tornieporth, M.D., Melanie Saville, M.B., B.S., and Fernando Noriega, M.D., for the CYD15 Study Group*

Articles

Clinical efficacy and safety of a novel tetravalent dengue vaccine in healthy children in Asia: a phase 3, randomised, observer-masked, placebo-controlled trial

*Maria Rosario Capeding, Ngoc Huu Tran, Sri Rezeki S Hadinegoro, Hussain Imam HJ Muhammad Ismail, Tawee Chotpitayasunondh, Mary Noreen Chua, Chan Quang Luong, Kusnandi Rusmil, Dewa Nyoman Wirawan, Revathy Nallusamy, Punnee Pitisuttithum, Usa Thisyakorn, In-Kyu Yoon, Diane van der Vliet, Edith Langevin, Thelma Laot, Yanee Hutagalung, Carina Frago, Mark Boaz, T Anh Wartel, Nadia G Tornieporth, Melanie Saville, Alain Bouckenooghe, and the CYD14 Study Group**

Chikungunya Fever

The NEW ENGLAND JOURNAL of MEDICINE

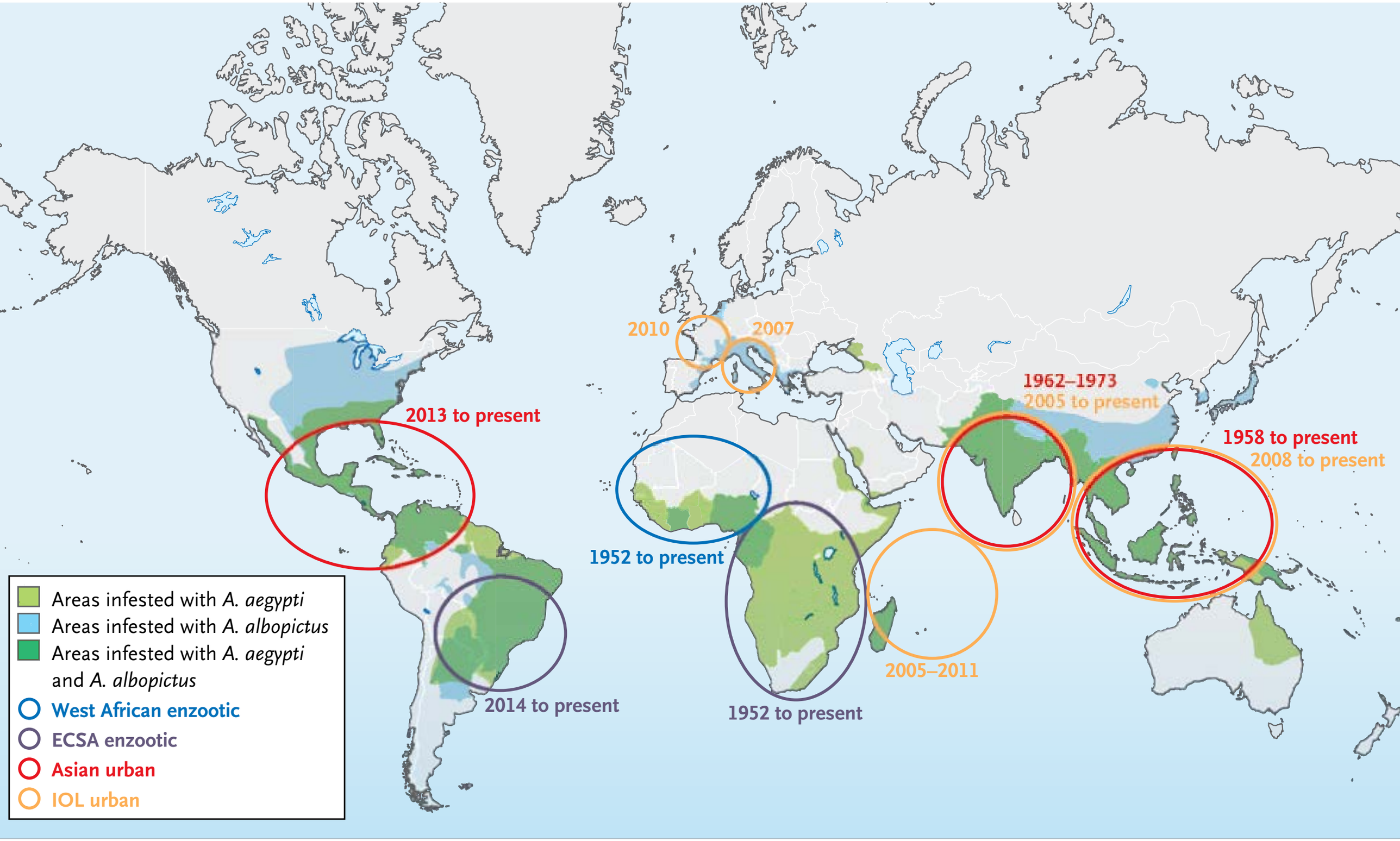
Perspective

Chikungunya at the Door — Déjà Vu All Over Again?

David M. Morens, M.D., and Anthony S. Fauci, M.D.

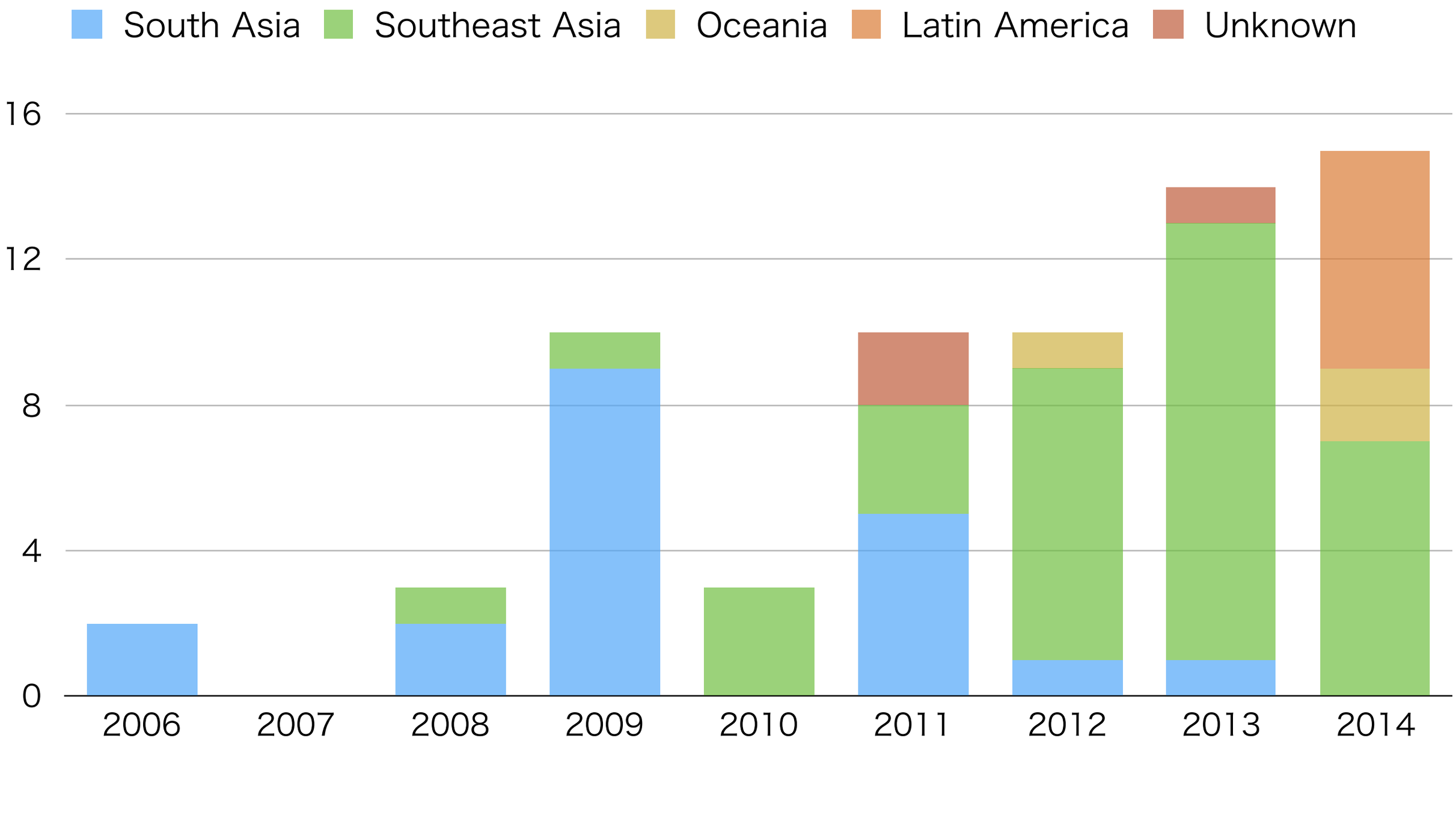
N Engl J Med 2014; 371:885-887 | September 4, 2014 | DOI: 10.1056/NEJMp1408509

Spreading of CHIK fever



N Engl J Med. 2015 Mar 26;372(13):1231-9.

Reported cases of CHIK fever in Japan



Mosquito-borne diseases are spreading!

ZIKV infection

HOW ZIKA SPREADS

Most people get Zika from a mosquito bite

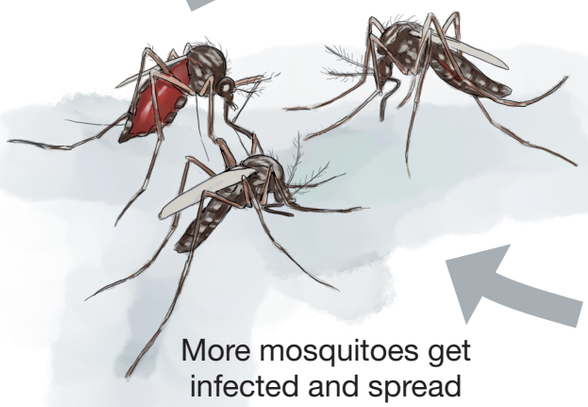
More members in the community become infected

A mosquito bites a person infected with Zika virus

The mosquito becomes infected

A mosquito will often live in a single house during its lifetime

The infected mosquito bites a family member or neighbor and infects them



More mosquitoes get infected and spread the virus

Other, less common ways, people get Zika:

During pregnancy
A pregnant woman can pass Zika virus to her fetus during pregnancy. Zika cause microcephaly, a severe birth defect that is a sign of incomplete bra development

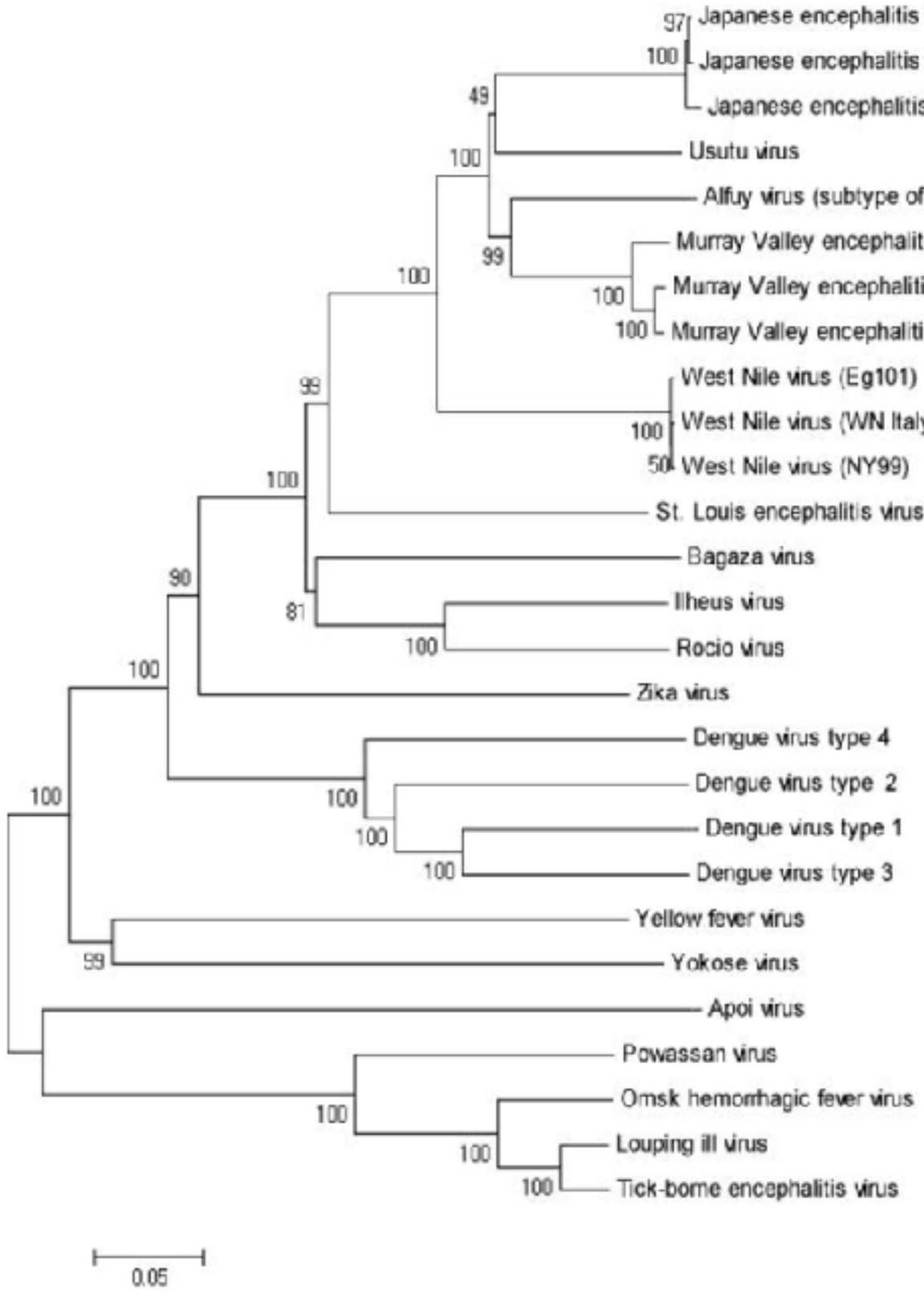
Through sex
Zika virus can be sexually transmitted b man to his partners

Through blood transfusion
There is a strong possibility that Zika virus can be spread through blood transfusions

Zika Virus

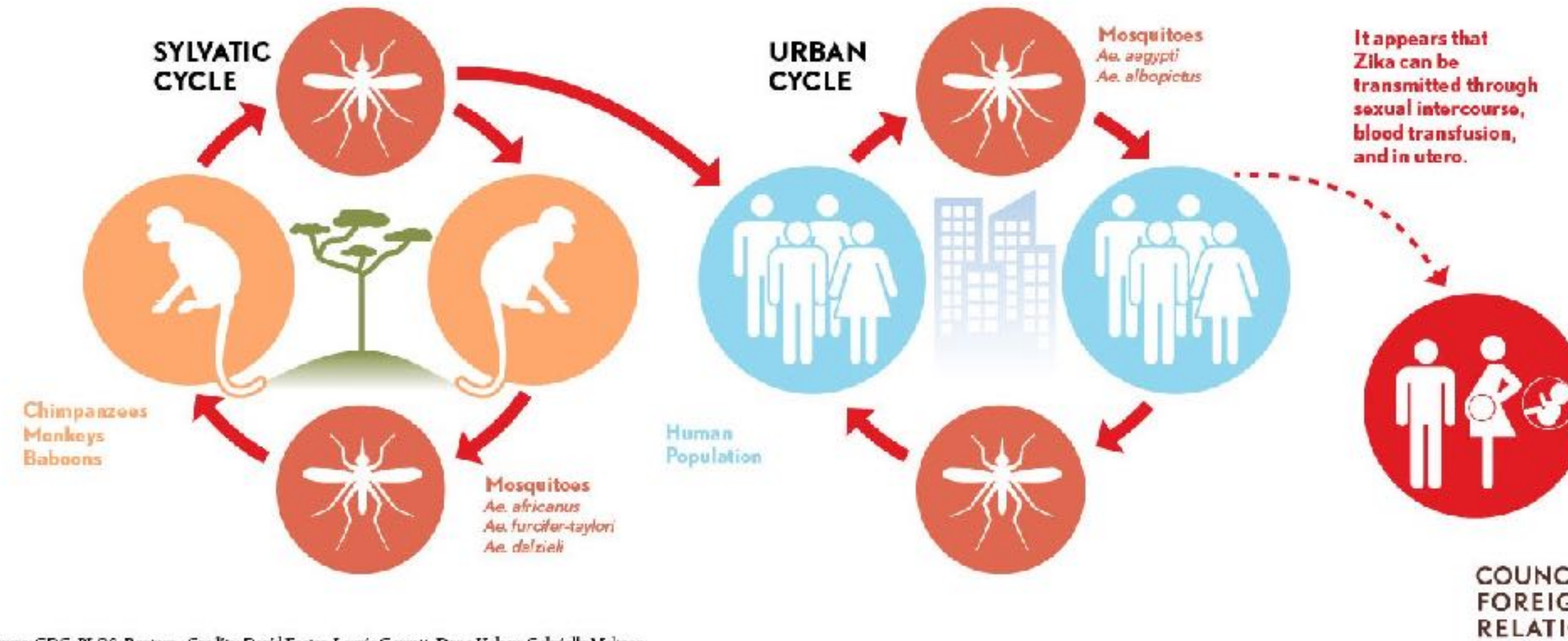
- Belongs to genus Flaviviridae, which includes DENV, West Nile, and yellow fever viruses

- Firstly isolated from the sentinel rhesus monkey from the Zika Forest in Uganda in 1947



Viruses 2015, 7(1), 219-238

How ZIKV spread?



Sources: CDC, PLOS, Reuters Credits: David Foster, Laurie Garrett, Doug Halsey, Gabriella Meltzer

http://ecdc.europa.eu/en/healthtopics/zika_virus_infection/zika-outbreak/pages/zika-countries-with-transmission.aspx

Nowadays cases reported in USA

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CDC Newsroom

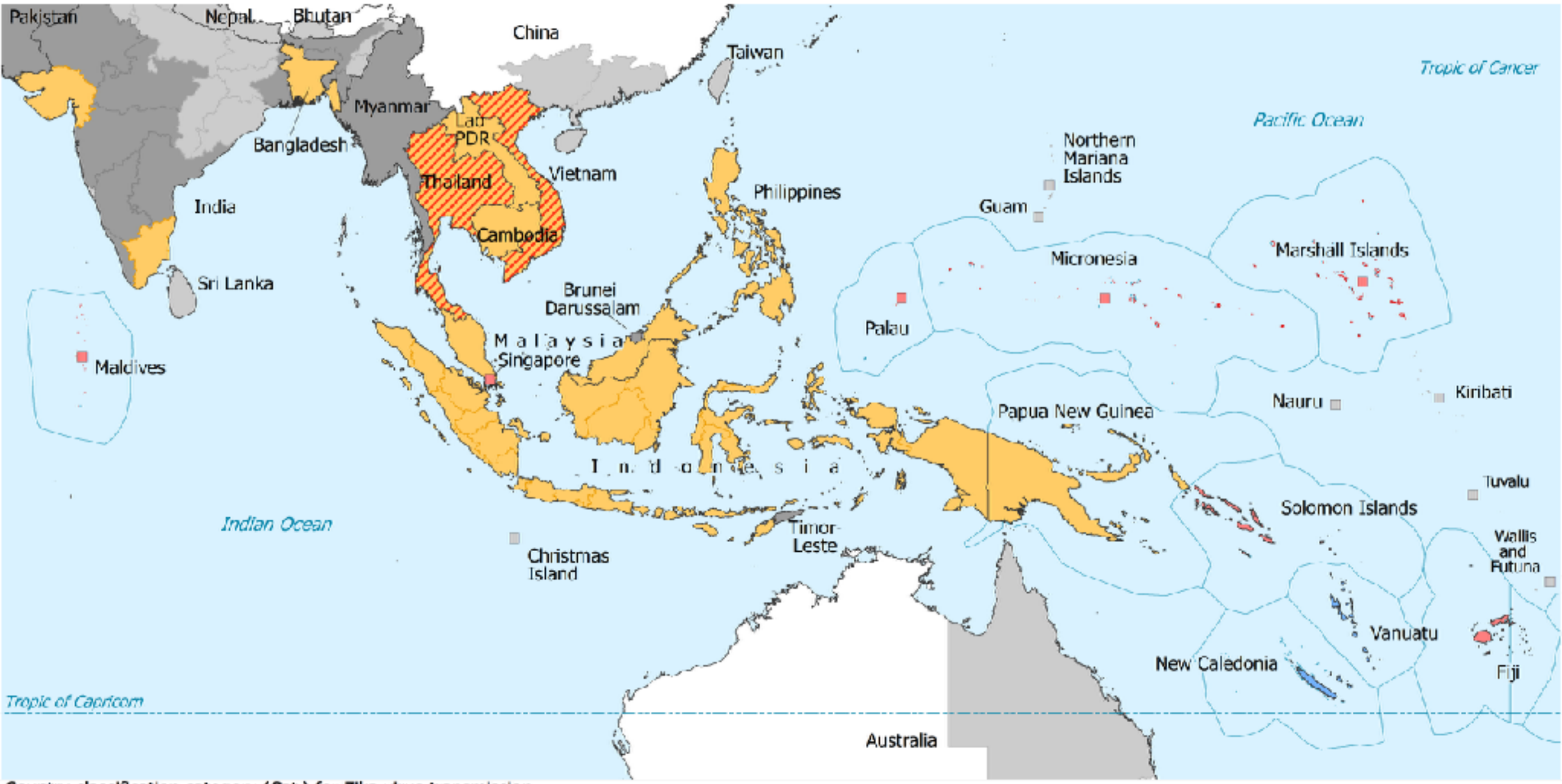
Florida investigation links four recent Zika cases to local mosquito-borne virus transmission

Press Release

For immediate release: Friday, July 29, 2016

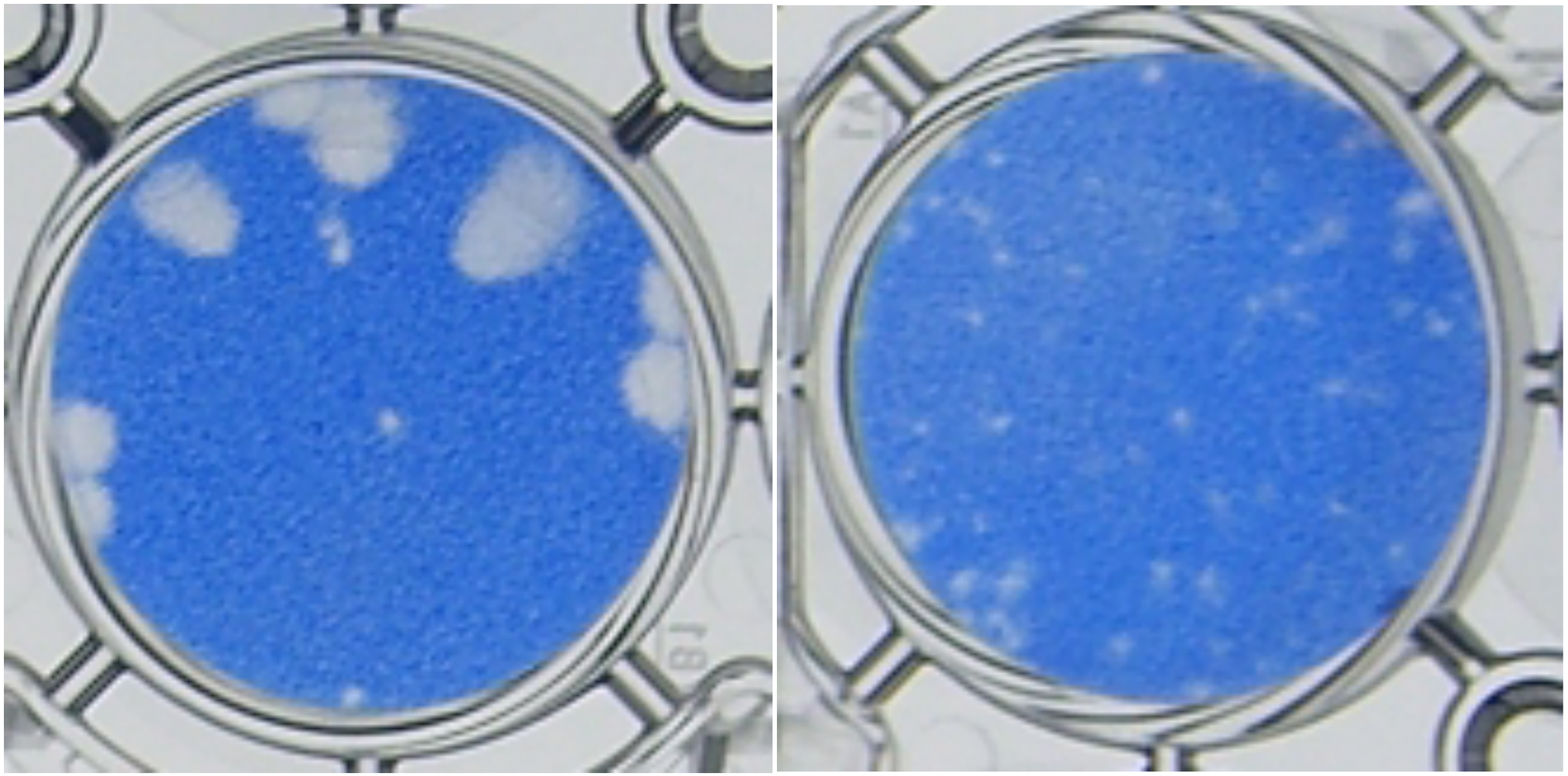
Contact: Media Relations

(404) 639-3286



ECDC. Zika transmission in South East Asia, as of 27 July 2017

東南アジアで流行している株は増殖能が低い？



ZIKV/Hu/S36/Chiba/2016

Pacific clade

ZIKV/Hu/NIID123/2016

Southeast Asian clade

Hashimoto T, Kutsuna S, Tajima S, Nakayama, et al. Emerg Infect Dis. 2017 Jul

ZIKA in indonesia

Trans R Soc Trop Med Hyg. 1981;75(3):389-93.

Zika virus, a cause of fever in Central Java, Indonesia.

Olson JG, Ksiazek TG, Suhandiman, Triwibowo.

Abstract

In 1977 and 1978 selected in-patients at the Tegalyoso Hospital, Klaten, Indonesia who had recent onsets of acute fever were serologically studied for evidence for alphavirus and flavivirus infections. A brief clinical history was taken and a check list of signs and symptoms was completed on admission. Acute and convalescent phase sera from 30 patients who showed evidence that a flavivirus had caused their illnesses were tested for neutralizing antibodies to several flaviviruses which occur in South-east Asia. Paired sera from seven patients demonstrated a fourfold rise in antibody titre from acute to convalescent phase. The most common clinical manifestations observed in this series of patients included high fever, malaise, stomach ache, dizziness and anorexia. None of the seven patients had headache or rash despite the fact that headache and rash had been associated with two of the three previously studied. The onsets of illness clustered toward the end of the rainy season when populations of Aedes aegypti, a probable vector in Malaysia, were most abundant.

The first human cases in the world
were reported from Indonesia.
They were diagnosed by serology
(Viruses were not isolated).

Am. J. Trop. Med. Hyg., 89(3), 2013, pp. 516–517
doi:10.4269/ajtmh.13-0029

Case Report: Zika Virus Infection Acquired During Brief Travel to Indonesia

Jason C. Kwong,* Julian D. Druce, and Karin Leder

Victorian Infectious Diseases Service, The Royal Melbourne Hospital, Melbourne, Victoria, Australia; Victorian Infectious Diseases Reference Laboratory, Melbourne, Victoria, Australia; Department of Epidemiology and Preventive Medicine, Monash University, Melbourne, Victoria, Australia

Abstract. Zika virus infection closely resembles dengue fever. It is possible that many cases are misdiagnosed or missed. We report a case of Zika virus infection in an Australian traveler who returned from Indonesia with fever and rash. Further case identification is required to determine the evolving epidemiology of this disease.

Southeast Asian J Trop Med Public Health. 2015 May;46(3):460-4.

ZIKA VIRUS INFECTION IN AUSTRALIA FOLLOWING A MONKEY BITE IN INDONESIA.

Leung GH, Baird RW, Druce J, Anstey NM.

Abstract

A traveller returning to Australia developed Zika virus infection, with fever, rash and conjunctivitis, with onset five days after a monkey bite in Bali, Indonesia. Flavivirus RNA detected on PCR from a nasopharyngeal swab was sequenced and identified as Zika virus. Although mosquito-borne transmission is also possible, we propose the bite as a plausible route of transmission. The literature for non-vector transmissions of Zika virus and other flaviviruses is reviewed.

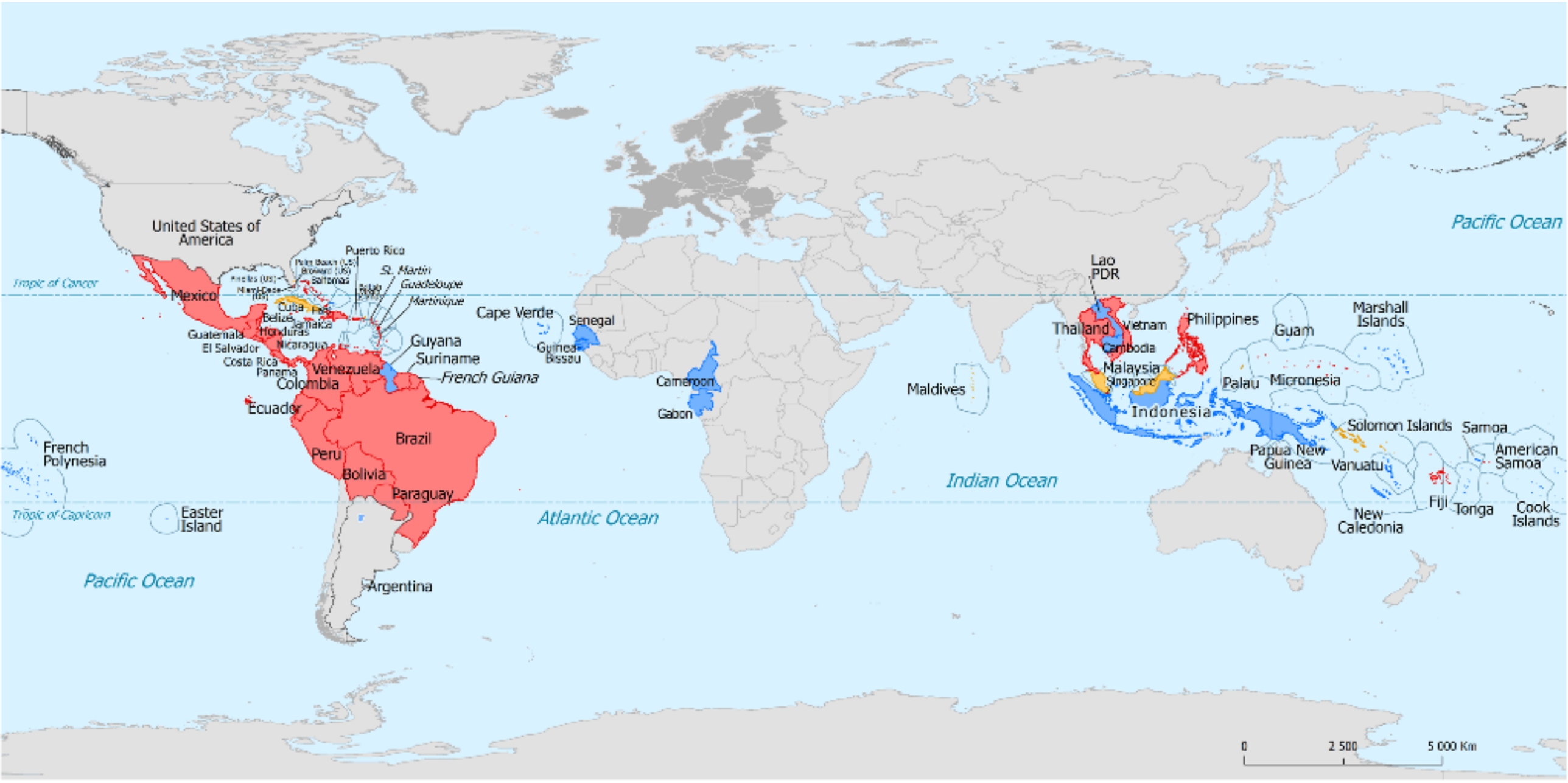
PMID: 26521519

Volume 22, Number 5—May 2016

Letter

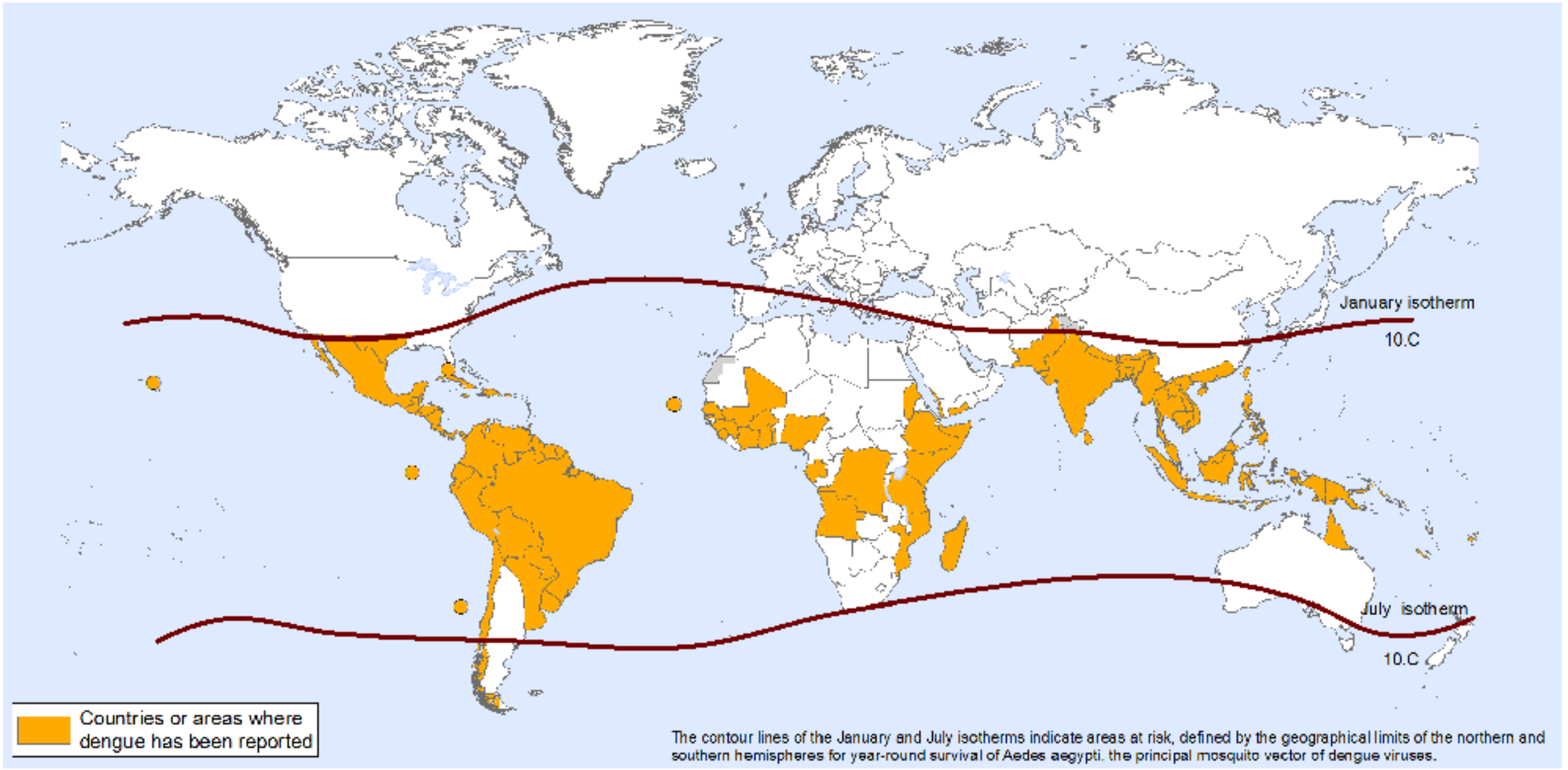
Isolation of Zika Virus from Febrile Patient, Indonesia

ZIKV distribution



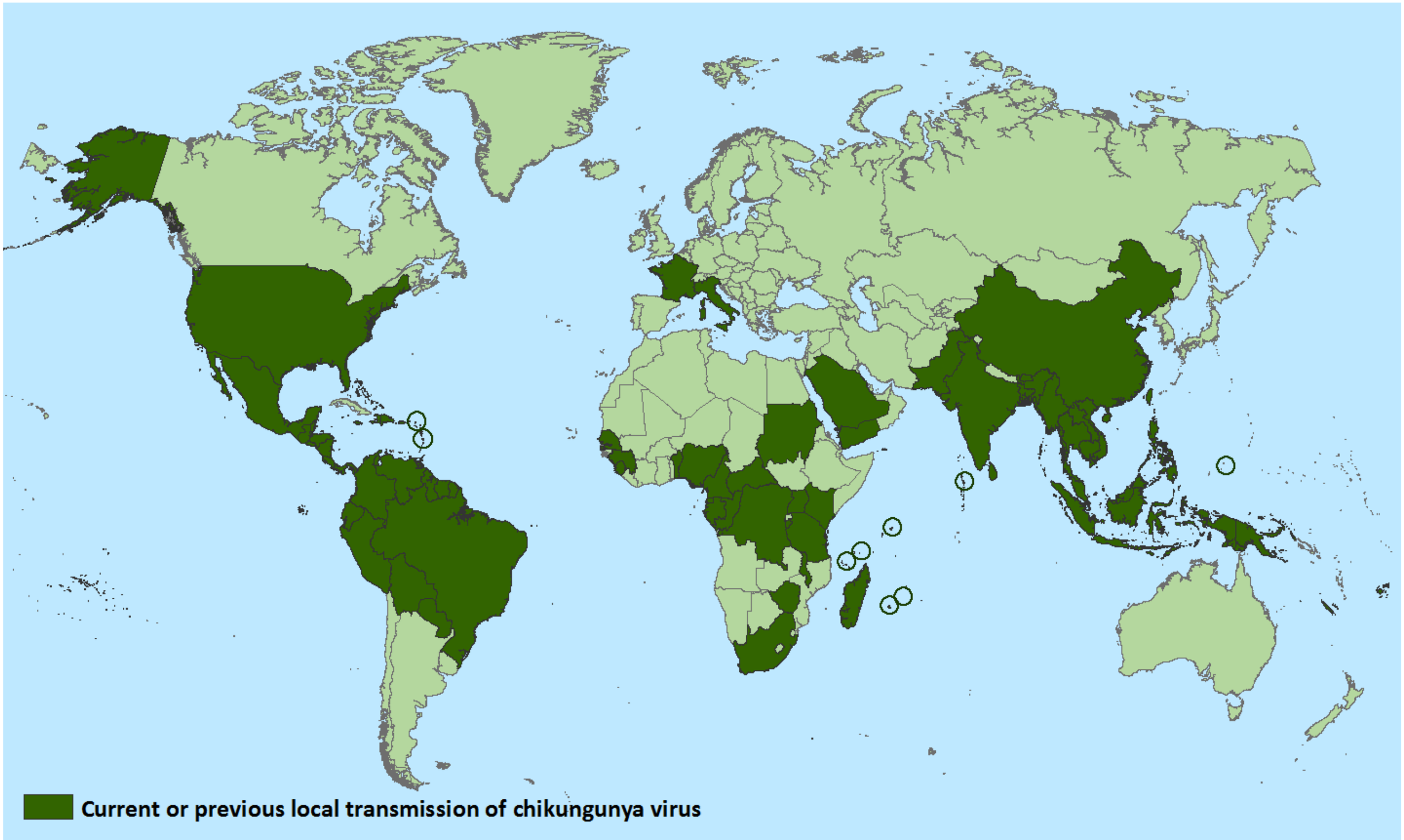
ECDC. Current ZIKA Transmission. Last updated on 7 November 2016

DENV distribution



WHO

CHIKV distribution



http://www.cdc.gov/chikungunya/pdfs/chikungunyaworldmap_10-20-2015.pdf

Areas of distribution are almost common in these 3 diseases

We should also consider ZIKV infection when we consider DF or CHIK

Now ZIKV is spreading to Southeast Asia, again

Zika: Vietnamese authorities report first microcephaly case likely linked to mosquito-borne virus

Updated 31 Oct 2016, 4:39am

Vietnam's Health Ministry has reported a microcephaly case that it says is likely to be the country's first linked to the mosquito-borne Zika virus.

The case, a four-month old baby whose mother was diagnosed with Zika when she was pregnant, was found in the central province of Dak Lak.

"This is a microcephaly case with a high probability of being related to the Zika virus and also the first such case in Vietnam," the General Department of Preventive Medicine, a department of the nation's health ministry, said in a statement posted on its official website.

PHOTO: Almost 2,000 cases of microcephaly in Brazil have been blamed on the mosquito-borne Zika virus.
(Reuters: Ueslei Marcelino)

Why is Zika spreading so quickly in Singapore?

By Emiko Jozuka, CNN

Updated 0229 GMT (1029 HKT) September 7, 2016

Top stories


U.S. envoy to U.N. blames and shames Syria, Russia over Aleppo


Syrian musicians who fled war form orchestra in Europe

Imported cases of ZIKV infection in Japan

First 3 cases diagnosed in NCGM in 2013-2014

Rapid communications

Two cases of Zika fever imported from French Polynesia to Japan, December 2013 to January 2014

S Kutsuna (sonare.since1192@gmail.com)[1], Y Kato[1], T Takasaki[2], M L Moi[2], A Kotaki[2], H Uemura[1], T Matono[1], Y Fujiya[1], M Mawatari[1], N Takeshita[1], K Hayakawa[1], S Kanagawa[1], N Ohmagari[1]

1. National Center for Global health and Medicine, Disease Control and Prevention Center, Tokyo, Japan
2. Department of Virology 1, National Institute of Infectious Diseases, Shinjukuku, Tokyo, Japan

Journal of Travel Medicine

International Society of Travel Medicine
Established 1991
Promoting healthy travel worldwide

Journal of Travel Medicine, 2016, 1–3
doi: 10.1093/jtm/tav011
Brief communication

Brief communication

Zika fever imported from Thailand to Japan, and diagnosed by PCR in the urines

Koh Shinohara, MD[1], Satoshi Kutsuna, MD[1]*, Tomohiko Takasaki, MD[2], Meng Ling Moi, PhD[2], Makiko Ikeda, PhD[2], Akira Kotaki, PhD[2], Kei Yamamoto, MD[1], Yoshihiro Fujiya, MD[1], Momoko Mawatari, MD[1], Nozomi Takeshita, MD[1], Kayoko Hayakawa, MD[1], Shuzo Kanagawa, MD[1], Yasuyuki Kato, MD[1], and Norio Ohmagari, MD[1]

Clinical Presentation on ZIKV infection

Table 1. Clinical Characteristics of 31 Patients with Confirmed Zika Virus Disease on Yap Island during the Period from April through July 2007.

Sign or Symptom	No. of Patients (%)
Macular or papular rash	28 (90)
Fever*	20 (65)
Arthritis or arthralgia	20 (65)
Nonpurulent conjunctivitis	17 (55)
Myalgia	15 (48)
Headache	14 (45)
Retro-orbital pain	12 (39)
Edema	6 (19)
Vomiting	3 (10)

* Cases of measured and subjective fever are included.

N Engl J Med 2009; 360:2536.

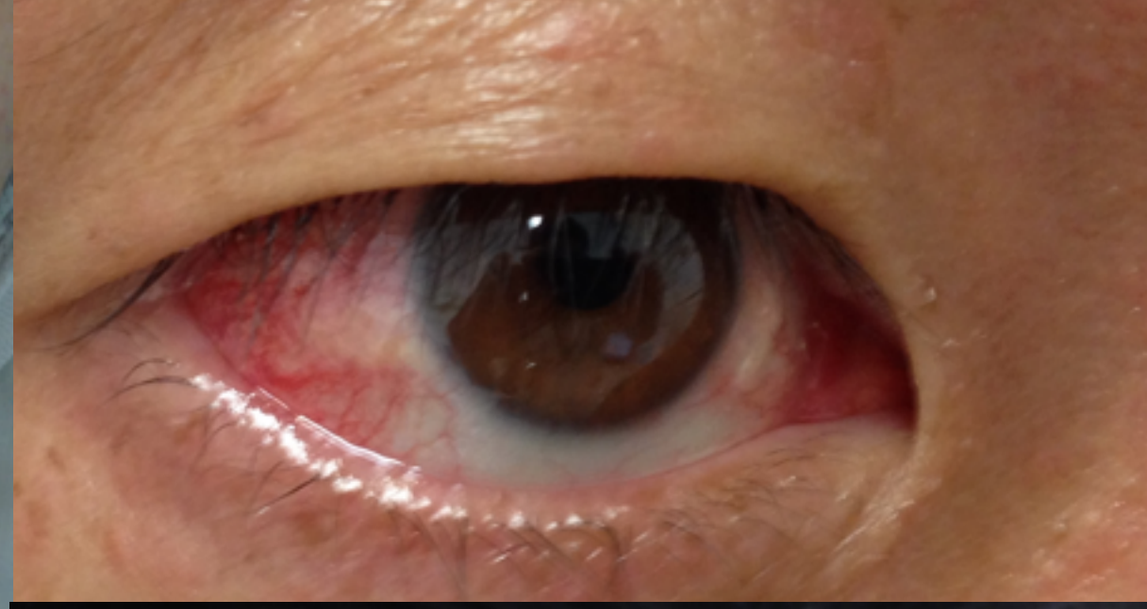
Volume 22, Number 7—July 2016

Letter

Clinical Manifestations of Zika Virus Infection, Rio de Janeiro, Brazil, 2015

Symptoms	n(%)
Exanthema	56 (98)
Fever†	38 (67)
Days from symptom onset to	1 (0–2)
Arthralgia	33 (58)
Itching	32 (56)
Headache	38 (67)
Myalgia	28 (49)
Retro-orbital pain	23 (40)
Conjunctivitis	22 (39)
Joint swelling	13 (23)

Emerg Infect Dis. 2016 Jul 15;22(6).

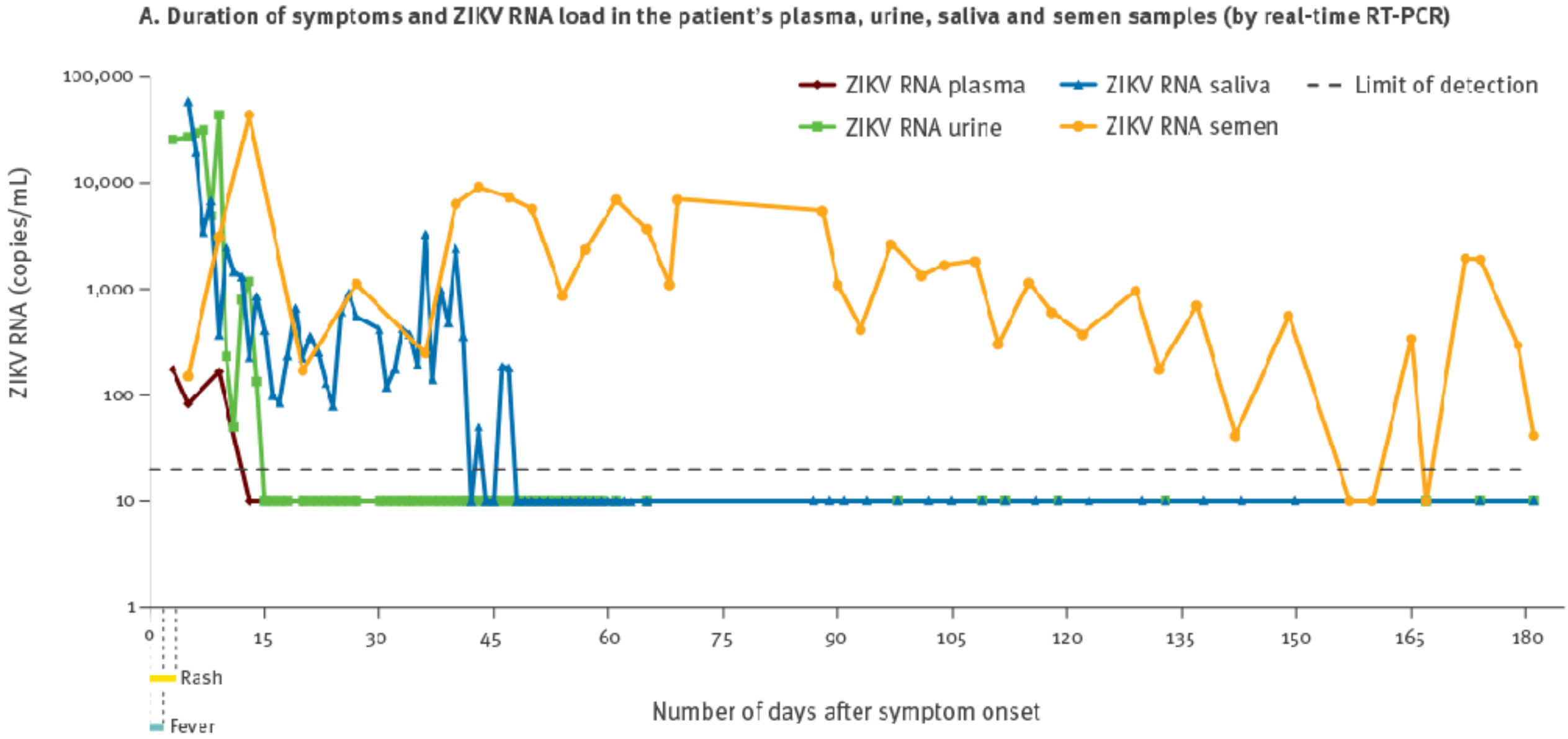


Diagnosis of ZIKV infection

- Detection of ZIKV by PCR
  - blood or urine：ZIKV detected longer in urine than in blood
- Antibody
  - Cross reactivity is reported among other Flavivirus(etc. DENV, YFV, JEV, …).

Am J Trop Med Hyg. 2014 Nov;91(5):1035-8.

More longer detection in saliva(45 days), and in semen(181 days)



Euro Surveill. 2016;21(32):pii=30316.

J Infect Chemother xxx (2016) 1–3

Contents lists available at ScienceDirect

Journal of Infection and Chemotherapy

journal homepage: http://www.elsevier.com/locate/jic

Case Report

A case of consecutive infection with Zika virus and Chikungunya virus in Bora Bora, French Polynesia

Satoshi Kutsuna [a, *], Yasuyuki Kato [a], Eri Nakayama [b], Satoshi Taniguchi [b], Tomohiko Takasaki [b], Kei Yamamoto [a], Nozomi Takeshita [a], Kayoko Hayakawa [a], Shuzo Kanagawa [a], Norio Ohmagari [a]

[a] *Disease Control and Prevention Center, National Center for Global Health and Medicine, Tokyo, Japan*
[b] *Department of Virology, National Institute of Infectious Diseases, Shinjuku-ku, Tokyo, Japan*

Neutralizing Antibody is useful for the cases which was infected more than 12 weeks ago.

Treatment

- None
- Only symptomatic treatment
- NSAIDs are not recommended for the patients not distinguished from DF

Prognosis

- Almost mild.

- Rarely fatal cases reported, especially in elderly or patients with comorbidity.

First death related to Zika virus recorded in continental U.S.

By Lindsay Whitehurst / The Associated Press

Published Jul 10, 2016 at 12:02AM

SALT LAKE CITY — A person infected with Zika has died in Utah, and while the exact cause is unclear, authorities said last week it marks the first death related to the virus in the continental U.S.

The unidentified Salt Lake County resident contracted the virus while traveling abroad to an area with a Zika outbreak, health officials said.

The patient who died in late June was elderly and also suffered from another health condition, according to the Salt Lake County Health Department.

The person had Zika symptoms — including rash, fever and conjunctivitis — but it's unclear if or how

Complication of ZIKV infection

- Guillain-Barre syndrome
- meningoencephalitis
- myelitis
- Congenital ZIKV infection (including microcephaly)

Epidemiological update: Complications potentially linked to the Zika virus outbreak, Brazil and French Polynesia. 27 Nov 2015

Guillain-Barré Syndrome outbreak associated with Zika virus infection in French Polynesia: a case-control study

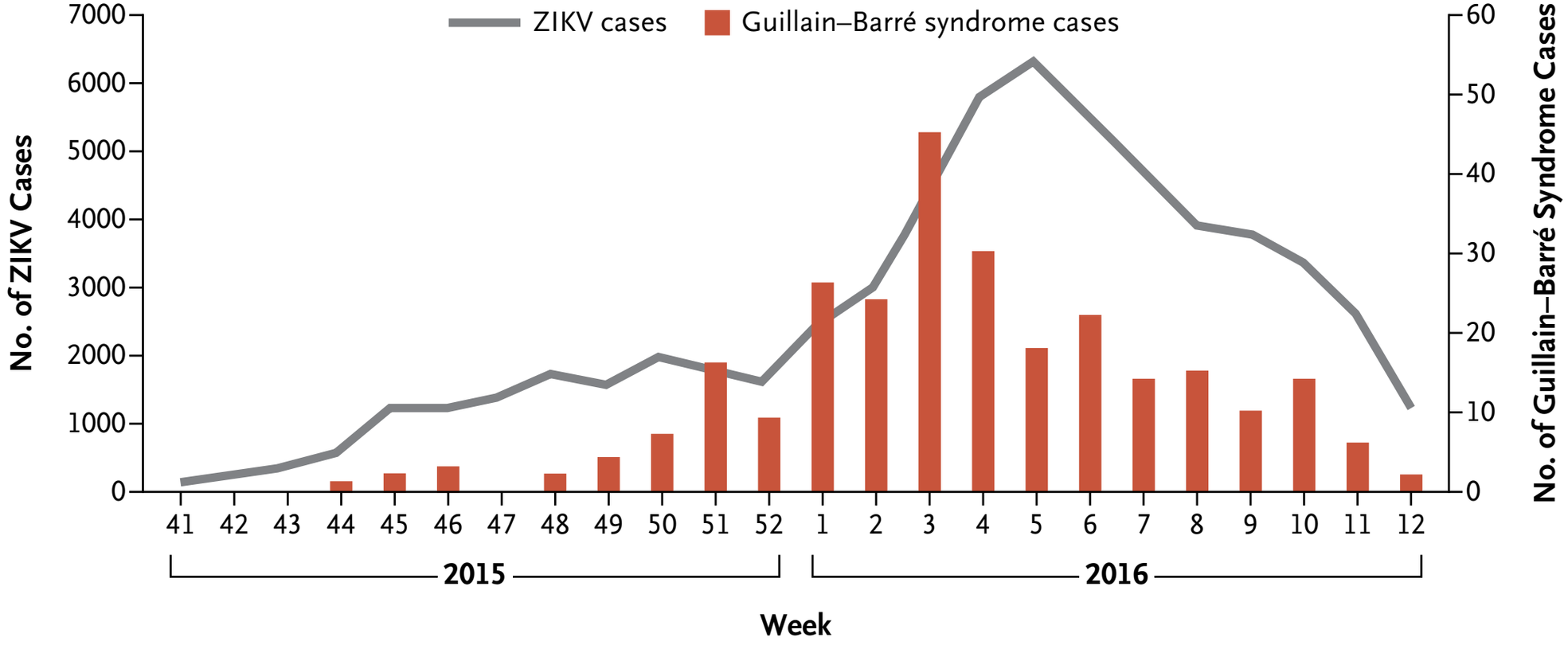
Van-Mai Cao-Lormeau, Alexandre Blake*, Sandrine Mons, Stéphane Lastère, Claudine Roche, Jessica Vanhomwegen, Timothée Dub, Laure Baudouin, Anita Teissier, Philippe Larre, Anne-Laure Vial, Christophe Decam, Valérie Choumet, Susan K Halstead, Hugh J Willison, Lucile Musset, Jean-Claude Manuguerra, Philippe Despres, Emmanuel Fournier, Henri-Pierre Mallet, Didier Musso, Arnaud Fontanet*, Jean Neil*, Frédéric Ghawché**

Lancet. 2016 Feb 29. pii: S0140-6736(16)00562-6.

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Guillain–Barré Syndrome Associated with Zika Virus Infection in Colombia



Cases of meningoencephalitis and myelitis

The NEW ENGLAND JOURNAL *of* MEDICINE

CORRESPONDENCE

Zika Virus Associated with Meningoencephalitis

Case Report

Acute myelitis due to Zika virus infection

Sylvie Mécharles, Cécile Herrmann, Pascale Poullain, Tuan-Huy Tran, Nathalie Deschamps, Grégory Mathon, Anne Landais, Sébastien Breurec, Annie Lannuzel

Microcephaly

Baby with Typical Head Size

Baby with Microcephaly

Baby with Severe Microcephaly

Microcephaly

- Occipitofrontal circumference (OFC) more than 2SD below the mean for age, sex, and gestation

- TORCH infections: Toxoplasmosis, Other (syphilis), Rubella, Cytomegalovirus (CMV) , Herpes simplex virus (HSV). Previously known as the causes of congenital anomaly including microcephaly.

ECDC. Microcephaly in Brazil potentially linked to the Zika virus epidemic

Table 3. Countries and territories that have reported microcephaly and/or CNS malformation cases potentially associated with Zika virus infection

Reporting country or territory	Number of microcephaly and/or CNS malformation cases suggestive of congenital Zika virus infections or potentially associated with a Zika virus infection	Probable location of infection
Bolivia	3[2]	Bolivia
Brazil	2079[3]	Brazil
Cabo Verde	9	Cabo Verde
Canada	1	Undetermined
Costa Rica	1	Costa Rica
Colombia	54[4]	Colombia
Dominican Republic	10[5]	Dominican Republic
El Salvador	4	El Salvador
French Guiana	10[6]	French Guiana
French Polynesia	8	French Polynesia
Grenada	1	Grenada
Guatemala	15[7]	Guatemala
Haiti	1	Haiti
Honduras	1	Honduras
Marshall Islands	1	Marshall Islands
Martinique	12[6]	Martinique
Panama	5	Panama
Paraguay	2[8]	Paraguay
Puerto Rico	3[9]	Puerto Rico
Slovenia	1[10]	Brazil
Spain	2	Colombia, Venezuela (Bolivarian Republic of)
Suriname	2	Suriname
Thailand	2	Thailand
Trinidad and Tobago	1	Trinidad and Tobago
Viet Nam	1	Viet Nam
United States of America	28[11]	Undetermined*

Clinical features of congenital Zika syndrome

Feature	Details
Microcephaly	▪ Defined as occipitofrontal circumference <3rd percentile ▪ Both proportionate and disproportionate microcephaly can occur
Other cranial dysmorphisms	▪ Craniofacial disproportion ▪ Overriding cranial sutures ▪ Craniosynostosis ▪ Cutis gyrata (redundant scalp)
Ocular abnormalities	▪ Focal pigmentary mottling ▪ Chorioretinal atrophy ▪ Optic nerve abnormalities
Hearing loss	▪ Sensorineural hearing loss
Arthrogryposis	▪ Congenital contractures (arthrogryposis) ▪ Unilateral or bilateral club foot
Neuromotor abnormalities	▪ Hypertonia/spasticity ▪ Hyperreflexia ▪ Irritability ▪ Dysphagia and feeding difficulties
Seizures	▪ Focal or generalized
Small size for gestational age	▪ Defined as birth weight <10th percentile for gestational age
Neuroimaging abnormalities	▪ Intracranial calcifications (most commonly at the junction between the cortical and subcortical white matter) ▪ Ventriculomegaly ▪ Reduced brain volume ▪ Delayed myelination ▪ Simplified gyral patterns (eg, polymicrogyria, pachygyria) ▪ Hypogenesis of the corpus callosum ▪ Hypoplasia of the brainstem and cerebellum ▪ Enlargement of the cisterna magna ▪ Increased extra-axial fluid

Ocular abnormalities in CZS

JAMA Ophthalmol. 2016 Feb 9

Hearing loss in CZS

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Morbidity and Mortality Weekly Report (*MMWR*)

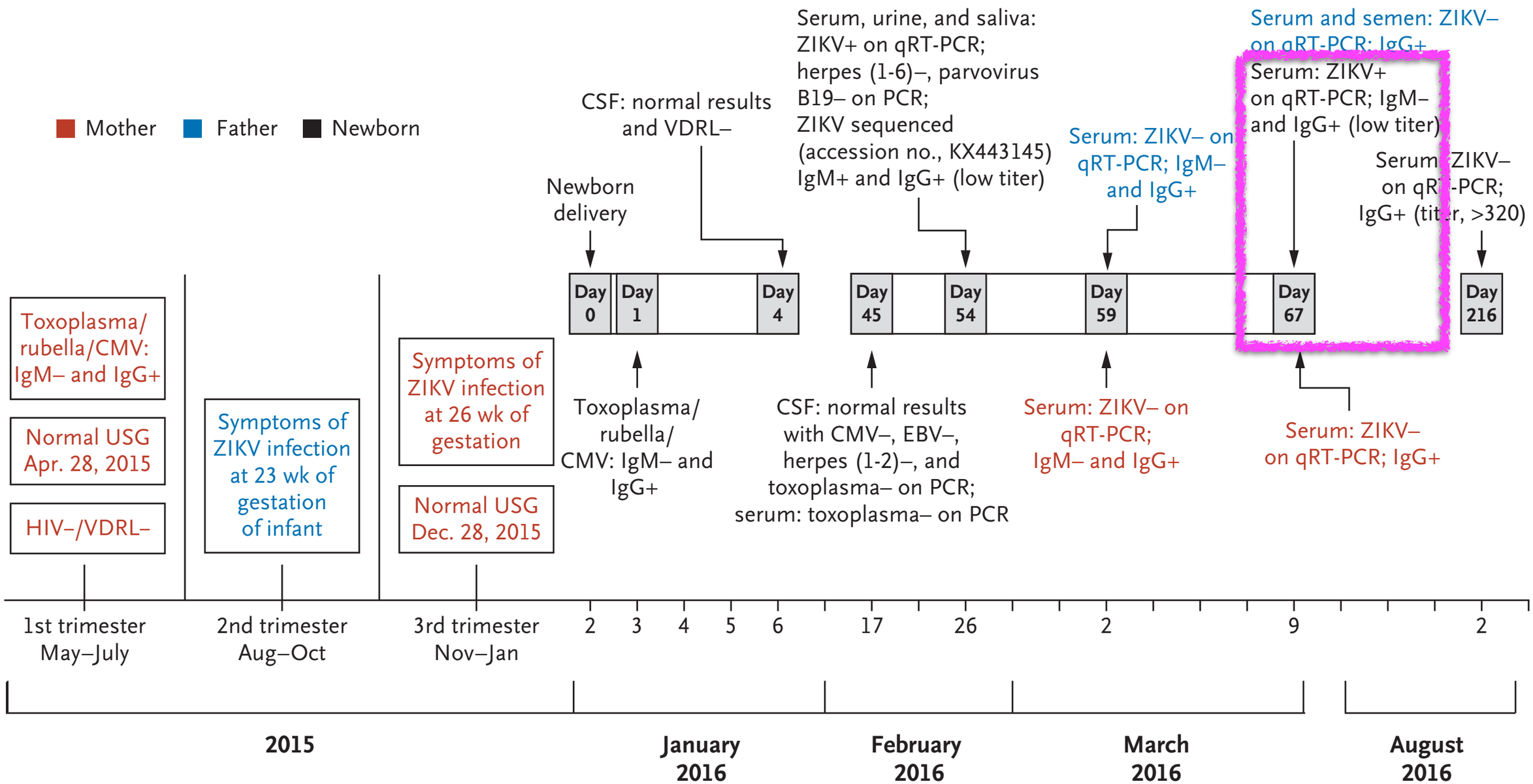
CDC > MMWR

Hearing Loss in Infants with Microcephaly and Evidence of Congenital Zika Virus Infection — Brazil, November 2015–May 2016

Early Release / August 30, 2016 / 65

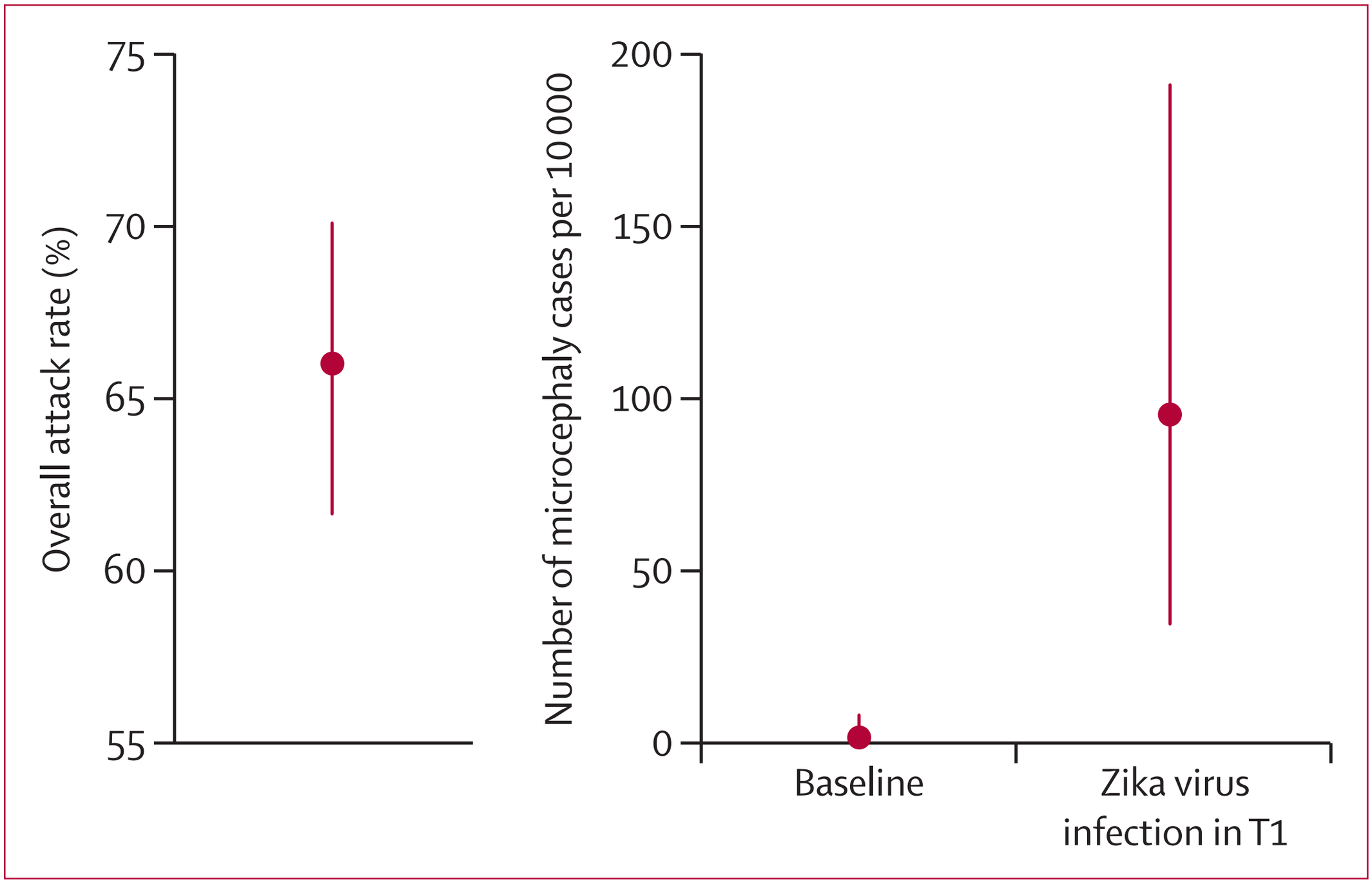
CORRESPONDENCE

Prolonged Shedding of Zika Virus Associated with Congenital Infection



Association between Zika virus and microcephaly in French Polynesia, 2013–15: a retrospective study

Simon Cauchemez, Marianne Besnard, Priscillia Bompard, Timothée Dub, Prisca Guillemette-Artur, Dominique Eyrolle-Guignot, Henrik Salje, Maria D Van Kerkhove, Véronique Abadie, Catherine Garel, Arnaud Fontanet, Henri-Pierre Mallet**



ZIKV infection as STD

First report of sexually transmitted ZIKV infection

Probable Non–Vector-borne Transmission of Zika Virus, Colorado, USA

Brian D. Foy, Kevin C. Kobylinski, Joy L. Chilson Foy, Bradley J. Blitvich,
Amelia Travassos da Rosa, Andrew D. Haddow, Robert S. Lanciotti, and Robert B. Tesh

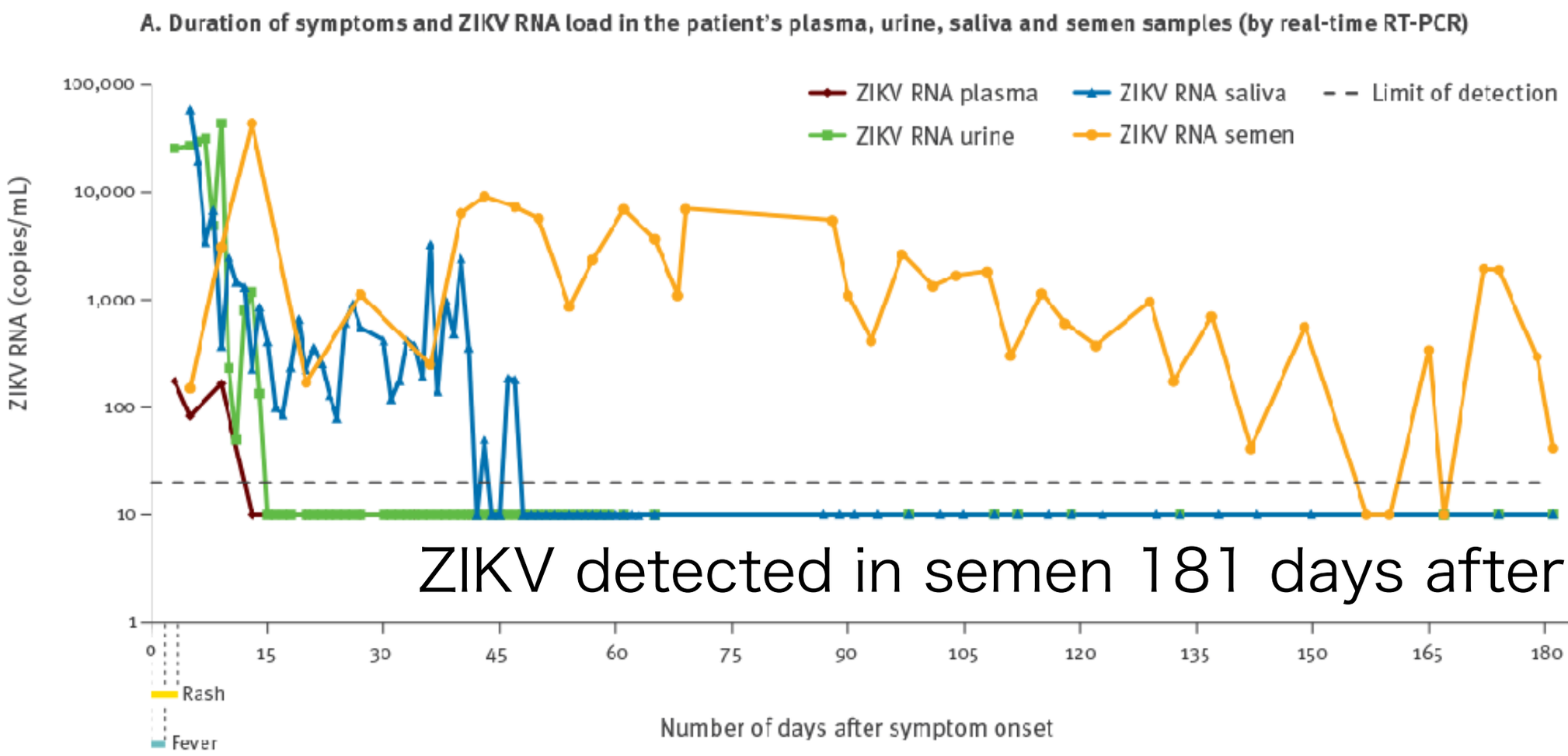
Emerg Infect Dis. 2011 May; 17(5): 880–882.

Potential Sexual Transmission of Zika Virus

Didier Musso, Claudine Roche, Emilie Robin, Tuxuan Nhan, Anita Teissier, Van-Mai Cao-Lormeau

ZIKV detected in semen 62 days after onset

Emerg Infect Dis. 2015 Feb;21(2):359-61.



ZIKV detected in semen 181 days after onset

Euro Surveill. 2016;21(32):pii=30316.

Morbidity and Mortality Weekly Report (*MMWR*)

Male-to-Male Sexual Transmission of Zika Virus — Texas, January 2016

Weekly / April 15, 2016 / 65(14);372–374

MMWR Morb Mortal Wkly Rep. 2016 Apr 15;65(14):372-4.

Zika virus in the female genital tract

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Morbidity and Mortality Weekly Report (*MMWR*)

CDC > MMWR

Suspected Female-to-Male Sexual Transmission of Zika Virus — New York City, 2016

Early Release / July 15, 2016 / 65

Alexander Davidson, MPH[1]; Sally Slavinski, DVM[1]; Kendra Komoto[1]; Jennifer Rakeman, PhD[1]; Don Weiss, MD[1] (View author affiliations)

View suggested citation

	Symptom onset, May 9, 2016	Genital testing, May 12, 2016	Follow-up, May 20, 2016
Blood	+	..	–
Urine	–	..	–
Cervical mucus	..	+	+
Endocervical swab	..	+	..
Genital swab	..	+	..

+=positive for Zika virus. –=negative for Zika virus. ..=test not done at the time.

Table: **RT-PCR Zika virus results**

ZIKV detected in female genital tract 11 days after onset

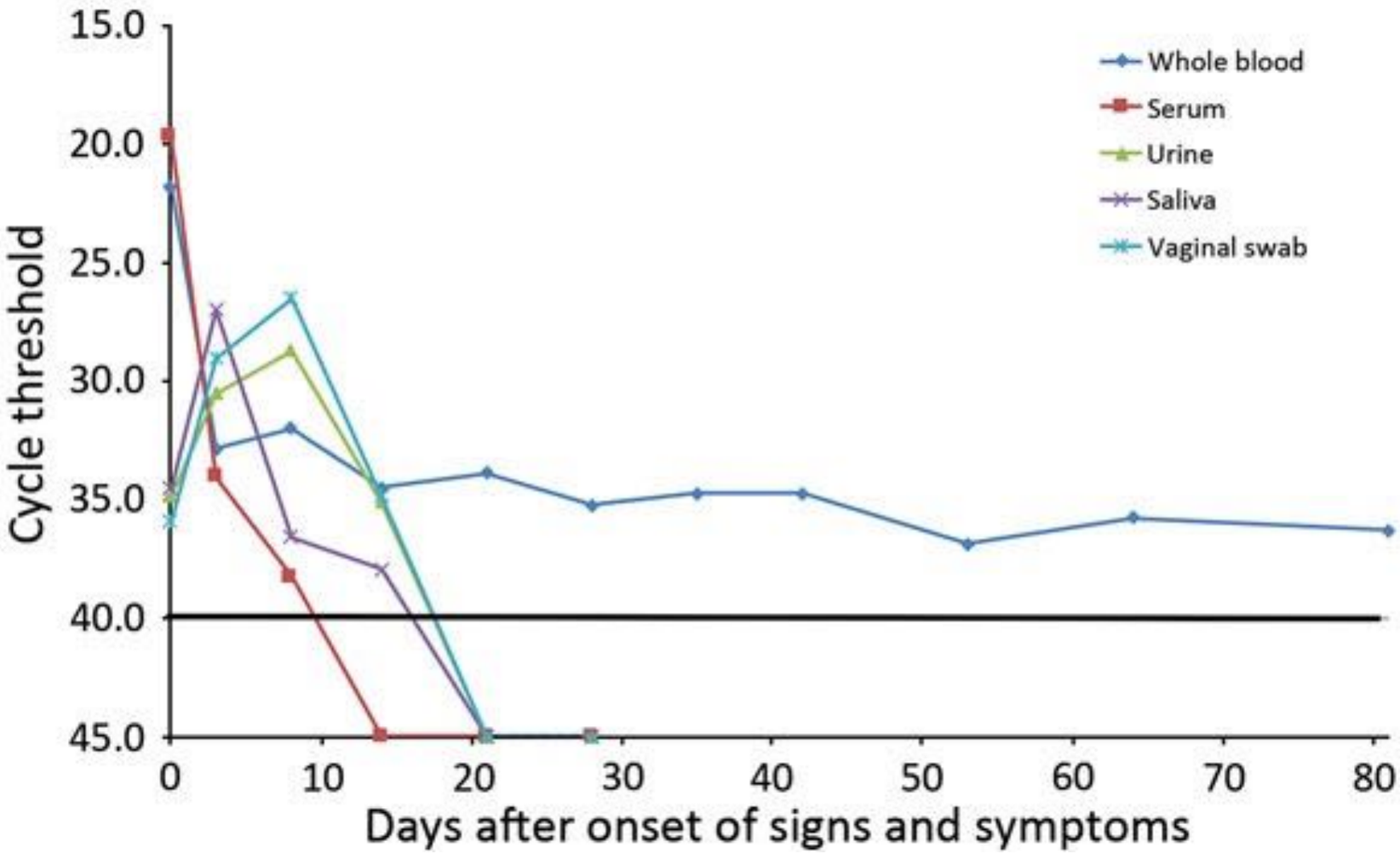
Female to Male transmission reported

Volume 23, Number 1—January 2017

Dispatch

Prolonged Detection of Zika Virus in Vaginal Secretions and Whole Blood

ZIKV detected in vaginal secretions 14days after onset



Sexual transmission of Zika virus in an entirely asymptomatic couple returning from a Zika epidemic area, France, April 2016

T Fréour [1,2], S Mirallié [1,2], B Hubert [3], C Splingart [1], P Barrière [1], M Maquart [4], I Leparc-Goffart [4]

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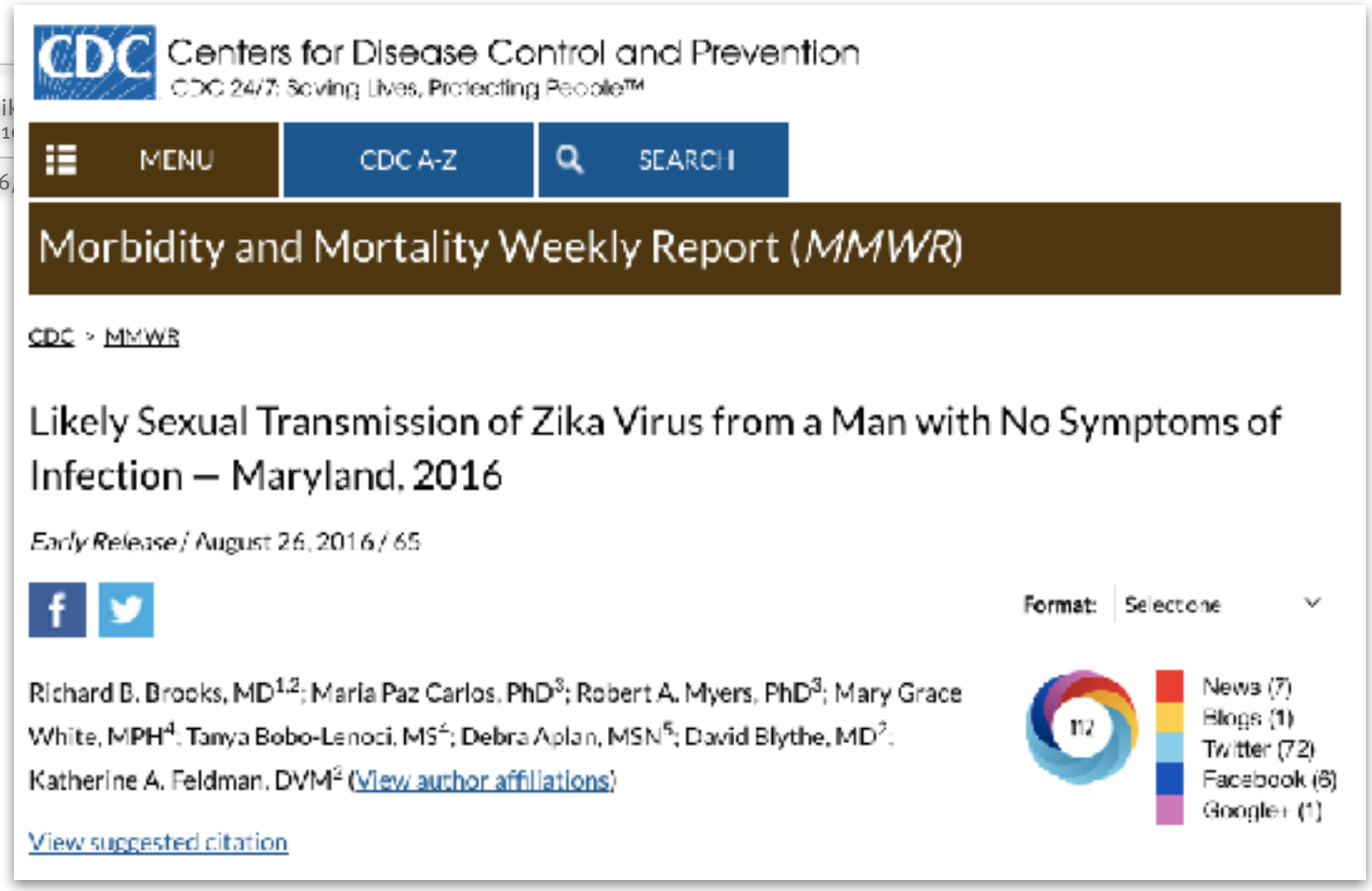
from a Zika epidemic area, France, April 2016. Euro Surveill. 2016;21(23):pii=30254. DOI: http://dx.doi.org/1

Article submitted on 30 May 2016,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Morbidity and Mortality Weekly Report (*MMWR*)
CDC > MMWR
Likely Sexual Transmission of Zika Virus from a Man with No Symptoms of Infection — Maryland, 2016
Early Release / August 26, 2016 / 65
Format: Select one
Richard B. Brooks, MD[1,2]; Maria Paz Carlos, PhD[3]; Robert A. Myers, PhD[3]; Mary Grace White, MPH[4]; Tanya Bobo-Lenoci, MS[4]; Debra Aplan, MSN[5]; David Blythe, MD[2]; Katherine A. Feldman, DVM[2] (View author affiliations)
View suggested citation
112
News (7)
Blogs (1)
Twitter (72)
Facebook (6)
Google+ (1)

2 reports sexually transmitted from **asymptomatic** male to female

Risk assessment about sexual transmission

- ZIKV sexual transmission is not rare
- Male to Female, Female to Male, Male to Male reported.
- Unknown how long do they continue to be infectious
- ZIKV detected in saliva, however unknown whether it is infectious or not
- Transmission could happen from completely asymptomatic male to female

Interim Guidance for Preconception Counseling and Prevention of Sexual Transmission of Zika Virus for Persons with Possible Zika Virus Exposure

		male	female
For Pregnant Women and Their Partners		during pregnant	
Not pregnant	confirmed or symptomatic	6 months	8 weeks
	No symptoms	6 months	8 weeks
	Live in Areas with Active Zika Virus	should be counseled	

MMWR Morb Mortal Wkly Rep. 2016 Oct 7;65(39):1077-1081.

CORRESPONDENCE

Evidence for Transmission of Zika Virus by Platelet Transfusion

Table 1. Results of Molecular and Serologic Testing of Samples Obtained from the Platelet Donor and the Two Recipients.*

Donor or Patient†	Molecular Testing				Serologic Testing						
	ZIKV (Ct)‡		CHIKV	DENV	PRNT§	IFA IgG¶		ZIKV POC‖		DENV-Capture ELISA**	
	Plasma	Urine	Plasma	Plasma	ZIKV	ZIKV	DENV	IgM	IgG	IgM	IgG
Donor											
Day –3	Pos (23)		Neg	Neg							
Day 11	Neg	Pos (33)	Neg	Neg	1:1280	++	+/–	Pos (143)	Pos (239)	Pos (1.4)	Neg (0.5)
Patient 1											
Day –4	Neg		Neg	Neg		–	+++	Neg (7)	Pos (57)	Neg (0.6)	Pos (5.0)
Day 6	Pos (33)		Neg	Neg		+	++++	Neg (9)	Sus (32)	Neg (0.7)	Pos (4.9)
Day 31	Neg				1:2560	++++	++++	Sus (33)	Pos (335)	Pos (2.3)	Pos (5.4)
Patient 2											
Day –1	Neg		Neg	Neg							
Day 1	Neg		Neg	Neg							
Day 23	Pos (36)	Neg	Neg	Neg	1:40	–	–	Neg (7)	Sus (20)	Neg (0.1)	Neg (0.3)
Day 51	Neg/Pos††				1:20	++	+/–	Neg (4)	Neg (17)	Neg (0.2)	Neg (0.3)
Day 71	Neg							Neg (12)	Neg (5)		

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Morbidity and Mortality Weekly Report (*MMWR*)

Preliminary Findings from an Investigation of Zika Virus Infection in a Patient with No Known Risk Factors — Utah, 2016

Early Release / September 13, 2016 / 65

The NEW ENGLAND JOURNAL of MEDICINE

CORRESPONDENCE

Fatal Zika Virus Infection with Secondary Nonsexual Transmission

Mysterious case of ZIKV infection without obvious exposure

- No exposure of mosquitos in ZIKV endemic countries
- No sexual exposure with patients of ZIKV infection
- The case had provided care to the patient of ZIKV infection(with high level viremia)

Take Home Message

- Mosquito-borne disease is global threat
- DENV, CHIKV, ZIKV spreading all over the world, and spreading of ZIKV in Southeast Asia
- Microcephaly caused by congenital ZIKV infection is serious problem