



Arbovirus surveillance in the Pacific

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Public Health Division

Secretariat of the Pacific Community (SPC)



DIPS, Korsor 2015

Arbovirus surveillance in the Pacific

- Secretariat of the Pacific Community
- Surveillance in the Pacific
- Epidemic wave of arboviruses
 - Dengue
 - Chikungunya
 - Zika
- Capacity building in epidemiology
 - Mass gathering surveillance
 - Post disaster surveillance
 - Field Epidemiology Training Programme



SPC delivers technical, scientific, research, policy and training support in:

- Agriculture
- Aquaculture
- Culture
- Education
- Energy
- Fisheries
- Forestry
- Gender issues
- Health
- Geosciences
- ICT
- Infrastructure
- Media development
- Transport
- Statistics
- Demography
- Water and sanitation
- Youth



SPC – Secretariat of the Pacific Community

- **Founded in 1947** by the Canberra Agreement.
- **26 member countries and territories** (22 Pacific Island Countries and Territories - PICTs)
- **Our mission:** *help Pacific Island people to respond effectively to the challenges they face and make informed decisions about their future and the future they wish to leave for following generations*
- **Core business** – strengthening Pacific Islands through:
 - capacity building/supplementation/substitution
 - coordinating trans-boundary/regional functions



National Minimum
Development
Indicators

Pacific Regional Information System
Statistics for Development Programme
Secretariat of the Pacific Community

Population & Development



Browse Data via the
Following Themes:

[Population](#)

[Poverty](#)

[Education](#)

[Economic Development](#)

[Labour Force](#)

[Social Services Provisions](#)

Human Development



Browse Data via the
Following Themes:

[Gender](#)

[Youth](#)

[Culture](#)

Bulk Data Downloads

[Summary of All Indicators](#)

[NMDI Bulk Dataset \(.ZIP\)](#)

More Datasets to Follow...

Agriculture & Forestry



Browse Data via the
Following Themes:

[Households](#)

[National Economy](#)

[Natural Resources](#)

Fisheries & Aquaculture



Browse Data via the
Following Themes:

[Economics - Labour Market Activity](#)

[Economics - Macro Aspects](#)

[Sustainable Livelihoods and Food
Security](#)

Communication & Infrastructure



Browse Data via the
Following Themes:

[Information Technology \(IT\)](#)

[Energy](#)

[Transport](#)

Public Health



Browse Data via the
Following Themes:

[Vital Statistics](#)

[Vector Borne Diseases \(Malaria\)](#)

[Communicable Diseases \(TB\)](#)

[Sexual Health \(HIV/AIDS & STI\)](#)

[Maternal Health](#)

[Child Health](#)

[Non-Communicable Diseases](#)

[Environmental Health](#)

[Health Systems](#)

Access MDG Data

Choose MDG Indicator below for cross-country comparisons



1
ERADICATE EXTREME POVERTY
AND HUNGER



2
ACHIEVE UNIVERSAL PRIMARY EDUCATION



3
PROMOTE GENDER EQUALITY AND
EMPOWER WOMEN



4
REDUCE CHILD MORTALITY



5
IMPROVE MATERNAL HEALTH



6
COMBAT HIV/AIDS, MALARIA AND OTHER
DISEASES



7
ENSURE ENVIRONMENTAL SUSTAINABILITY



8
A GLOBAL PARTNERSHIP FOR
DEVELOPMENT

[View/Create
Country Reports](#)

[MDG List
& Metadata](#)

Child Health Indicators

Public Health NMDIs

Click Indicator Names for Regional Bar-Chart, and Click Country Values for gender disaggregations and time-series

[View Country Reports](#)

[Back to Contents](#)

Indicator	Cooks	FSM	Fiji	Kiribati	RMI	Nauru	Niue	Palau	PNG	Samoa	Solomons	Tokelau	Tonga	Tuvalu	Vanuatu
Immunization-Measles PH-CH.1.1 MDG.4.3	100 2010	91 2009	71.8 2010	89 2010	90.2 2010	65 2010	100 2010	39 2010	50 2010	60.6 2010	80.6 2007	100 2011	99.4 2009	84.8 2010	80 2009
Immunization-DTP PH-CH-1.2	100 2007	75.3 2001	74.6 2009	58.3 2009	37.9 2007	55.7 2007	100 2009	49 2009	66.8 2007	37.2 2009	87.1 2007	100 2011	100 2007	60.2 2007	58.2 2007
Immunization-HepB3 PH-CH-1.3	82 2009	89 2009	74.6 2009	86 2009	99.7 2009	100 2009	100 2009	69 2009	64 2009	72 2009	81 2009	100 2009	99 2009	91 2009	82 2009
Low Birth Weight PH-CH-1.4	3.9 2009	11.1 2009	7.9 2007	22.1 2010	12.2 2011	27 2002-07	0 2005	6.9 2010	8.7 2010	10.2 2004-09	12.5 2002-07	0 2011	2.8 2009	6.1 2002-07	10.2 2007
U5 Child-Underweight PH-CH-1.5		15 2005	7 2008	23.1 2009	13 2007	5.6 2007	0 2005	2.2 2010	27.2 2010	1.9 1999	14.2 2007	0 2011	2 1999	1.9 2007	15.9 2007

Please leave some feedback:

Type Here...



Your Name

Your Email

Send

 In total there are **164** Values in the database for Child Health Indicators (Public Health). [Download Summary to Excel](#)

 22.9
2011

 46.1
2008

 Recent Data
(>= 2010)

 Older Data
(<= 2009)

 No Data
(Not Applicable)



Surveillance in the Pacific

Several sources for a comprehensible picture

- PacNet
- Laboratory based surveillance
- Country surveillance/notifiable disease reports
- Syndromic surveillance
 - Acute fever and rash, Prolonged fever, Influenza like illness
- Event-based surveillance
 - Media and personal communication
- Surveillance by proxy

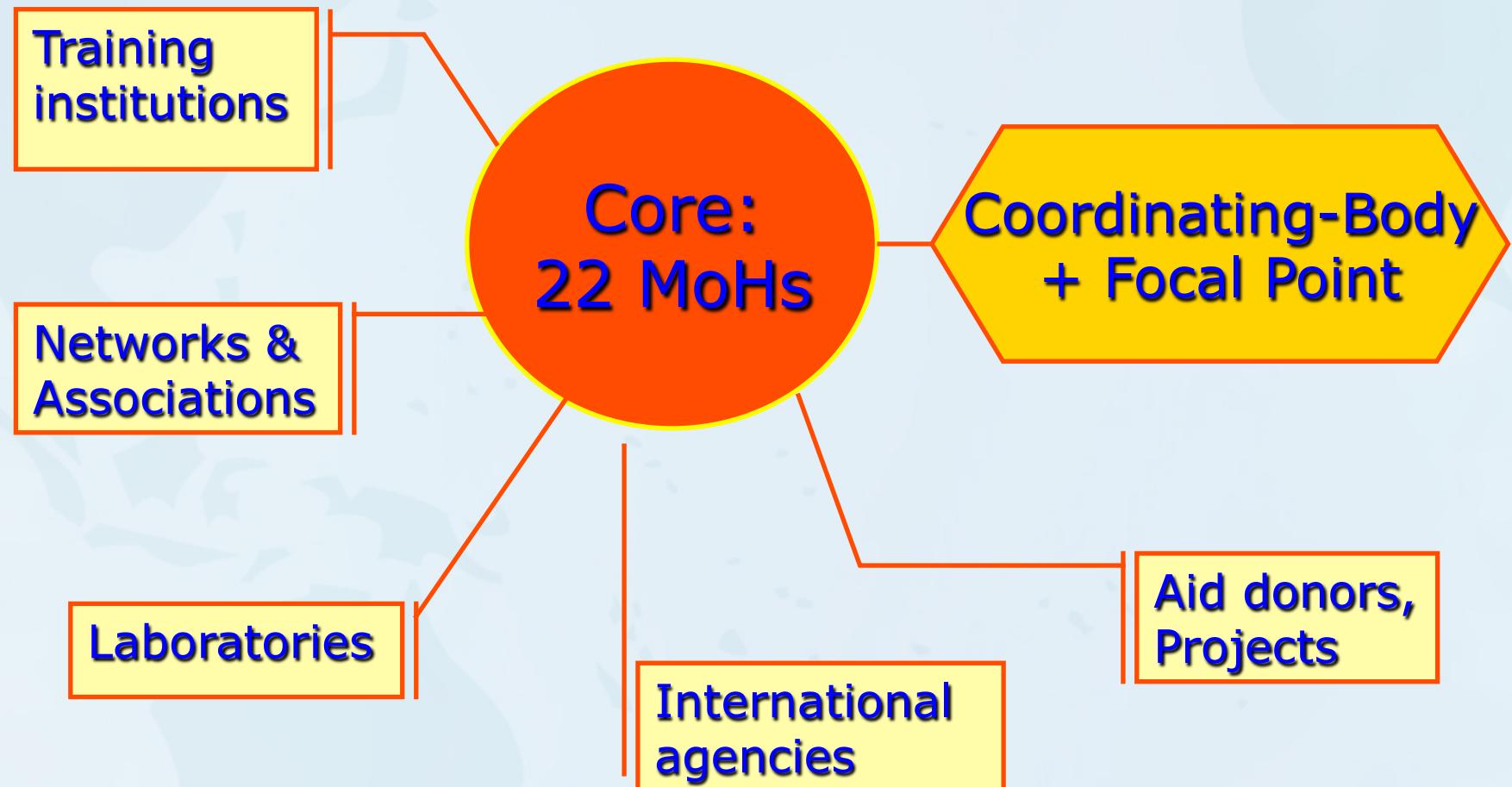


Pacific Public Health Surveillance Network (PPHSN) Background

- PPHSN is a voluntary network of countries/territories and organisations – created in 1996 supported by SPC & WHO
- Promotes public health surveillance & response
- Outbreak prone CDs in focus. Should include all public health emergencies
 - Set priority target diseases: influenza, dengue, measles, leptospirosis, cholera, typhoid, HIV/AIDS, (TB)
- PPHSN goal is to improve public health surveillance and response in the Pacific Islands, in a sustainable way



PPHSN Institutional Framework





PPHSN Networking Services

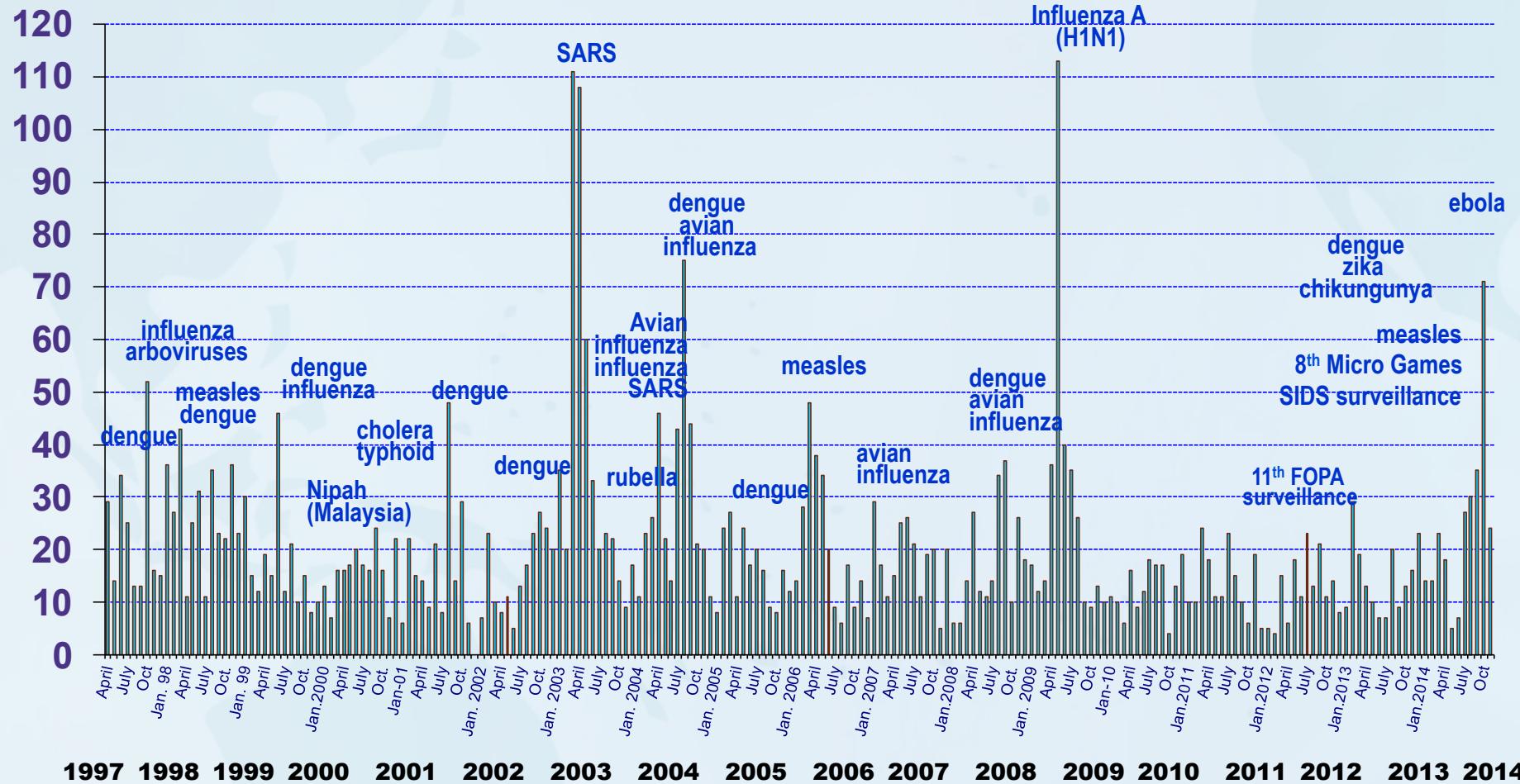
PPHSN services

- PacNet
- LabNet
- EpiNet
- PICNet
- Syndromic surveillance

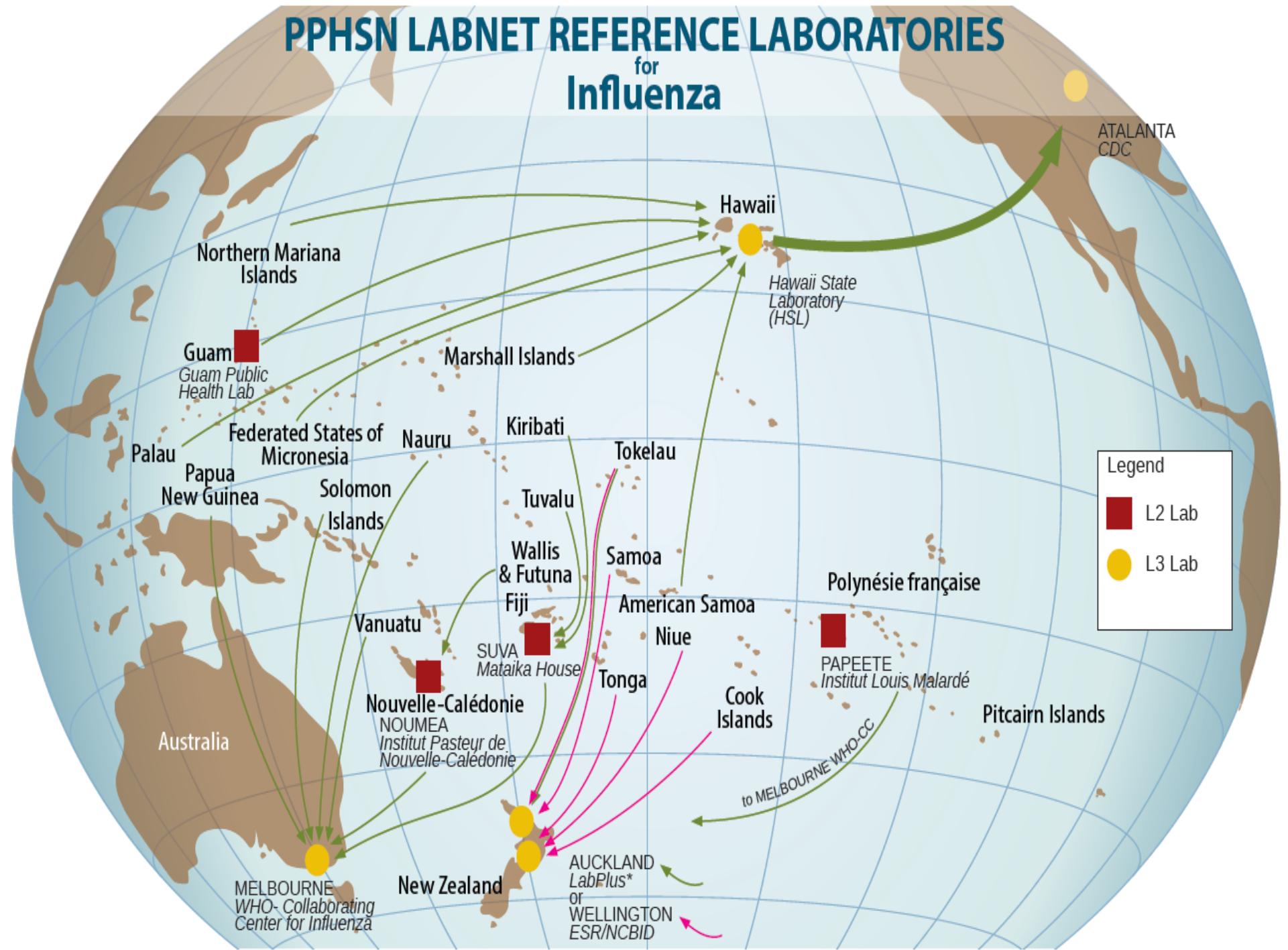
Operational steps

- Alert & Communication
- Verification & Identification
- Investigation & Response
- Infection control
- Outbreak detection

Number of messages posted per month, 1997- 2014



PPHSN LABNET REFERENCE LABORATORIES for Influenza



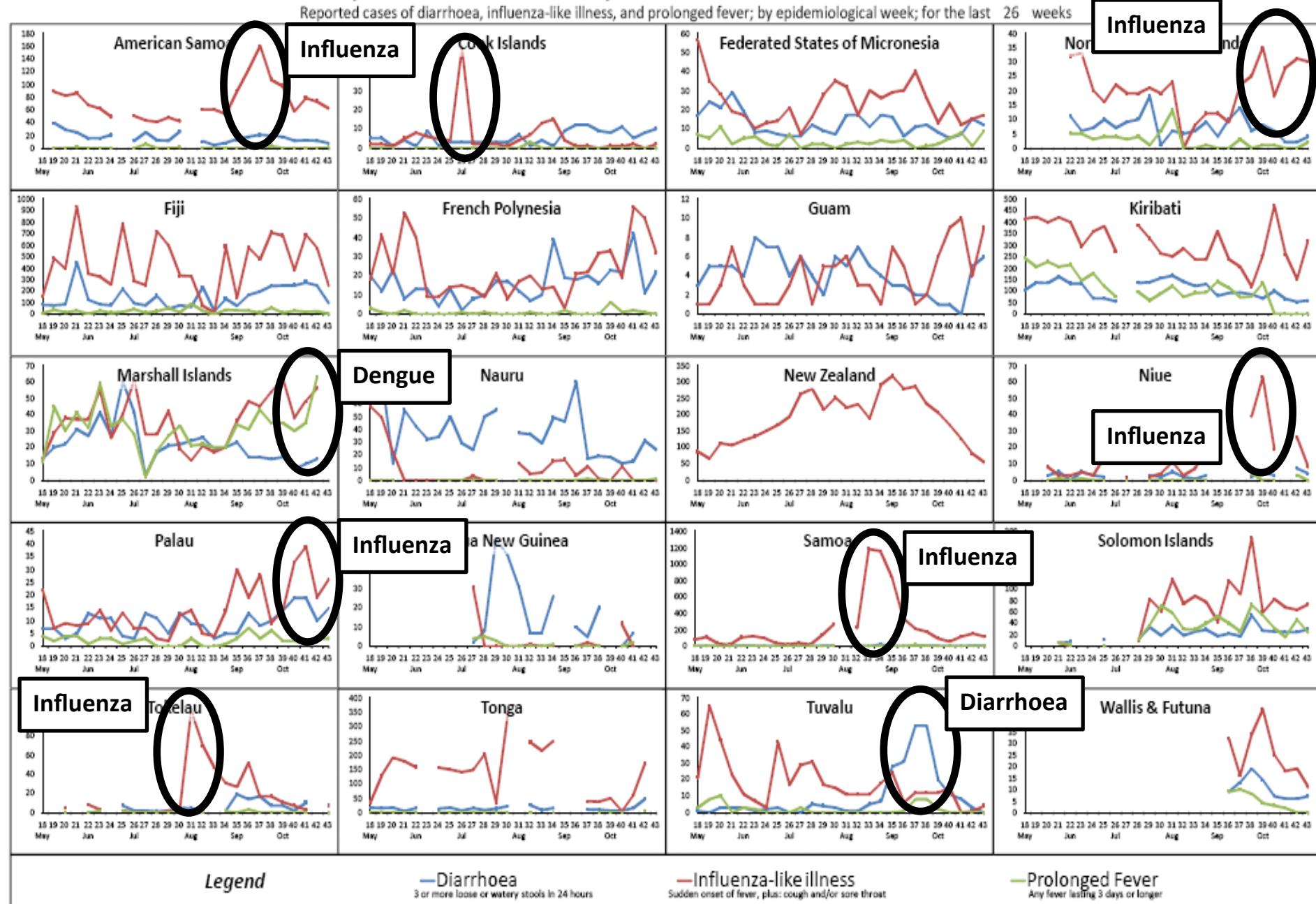
Pacific Syndromic Surveillance System

Reported cases of diarrhoea, influenza-like illness, and prolonged fever; by epidemiological week; for the last 26 weeks

2011

week 43

ending 30 October 2011



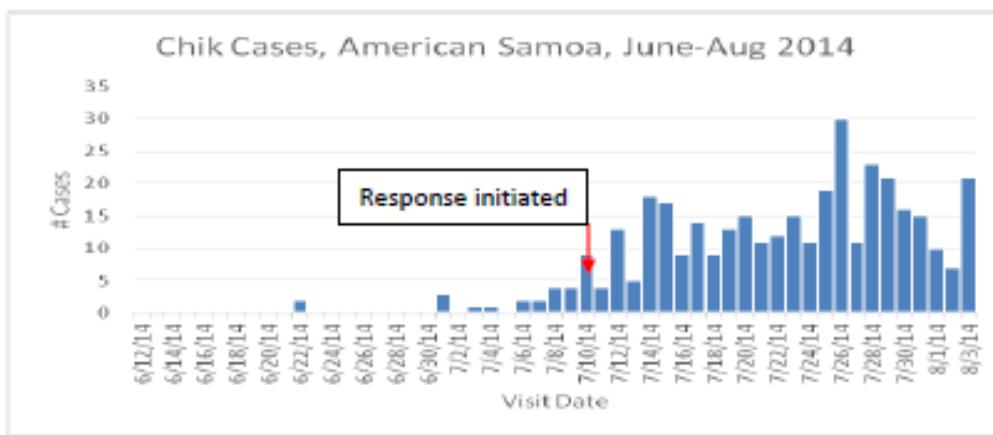
Note: Numbers of reported cases are not comparable between countries. The purpose of the charts is to show trends over time within each country/area.



Situation Report, Chikungunya Outbreak, American Samoa- August 4, 2014

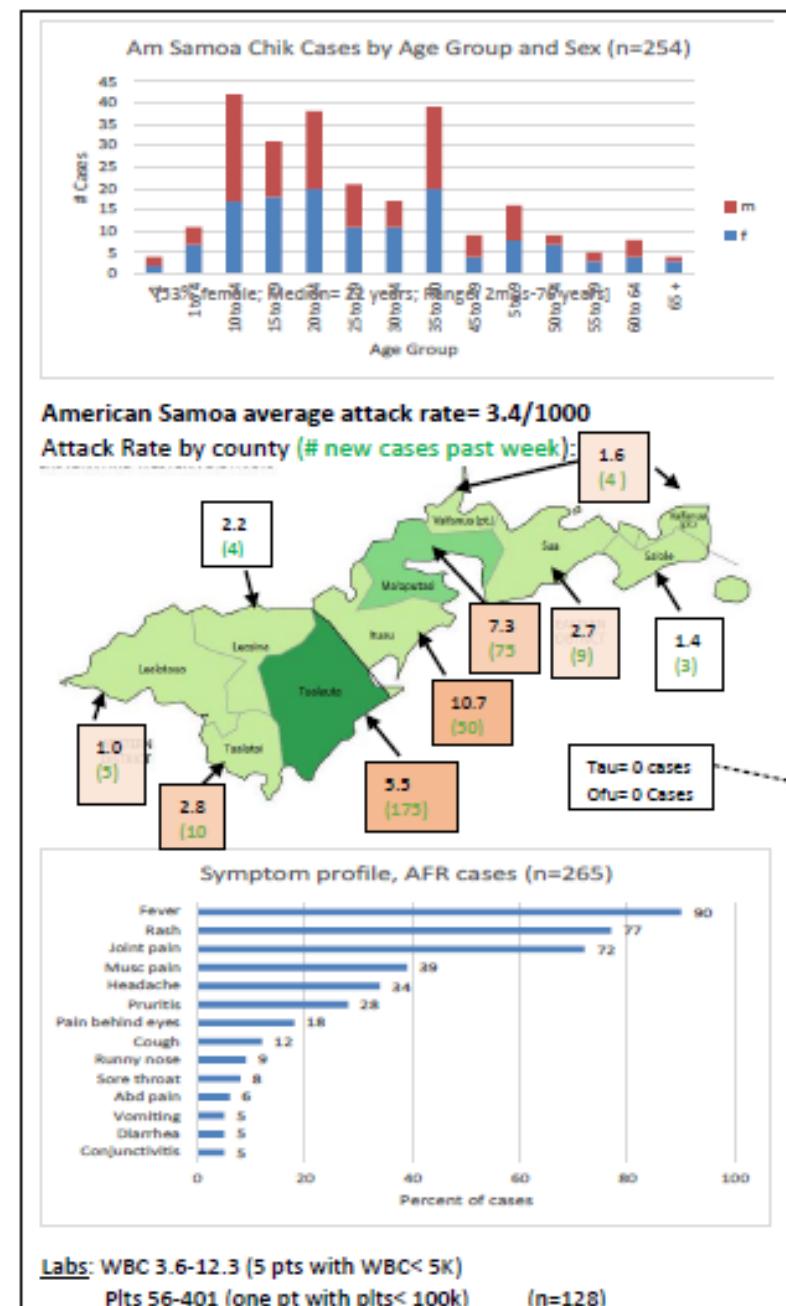
Case definition (probable cases): Acute illness since June 15, 2014 with at least two of the following: fever, rash, body aches.

To date there are 361 probable cases reported with 7 hospitalizations and 0 deaths (possible death from chik ruled out by reference lab testing). Reference lab testing confirmed positive for chikungunya (X of Y patients tested). Reference lab tests negative for dengue, Zika and measles with further testing in progress. Note that Chikungunya is an Aedes mosquito-borne disease. (more info at: www.cdc.gov/chikungunya/)



Response measures:

Mass text messages and media releases done regarding risk of disease, probable mode of spread, encouraging clinic or ER care for patients with acute fever, rash and/or body aches, mosquito control and avoidance of bites. Working on setup & protocol for "Chik Hotline" for management of patients by phone. Alert and situation updates to physicians, nurses, key government agencies in American Samoa, PacNet. Stepped-up vector control messages by American Samoa EPA, ASPA and DOH Environmental Health Unit and one day-long clean up activity in the Pago area. Working on multi-agency village vector control plan. Fliers in Samoan and English regarding risk of disease and mosquito control to clinics and ER to distribute to patients. Travel advisories being developed. Clinical in-service training done for LBJ physicians re. Chikungunya on 7-23-14. Further CDC reference lab test results pending. Many thanks for assistance from CDC, WHO, Hawaii Public Health Lab, SPC, and ASCC.





Epidemic wave of arboviruses

Diagnostic challenge

- Similar clinical presentation of arboviruses
- Long laboratory turn around times
- Other outbreaks and infections: measles, leptospirosis

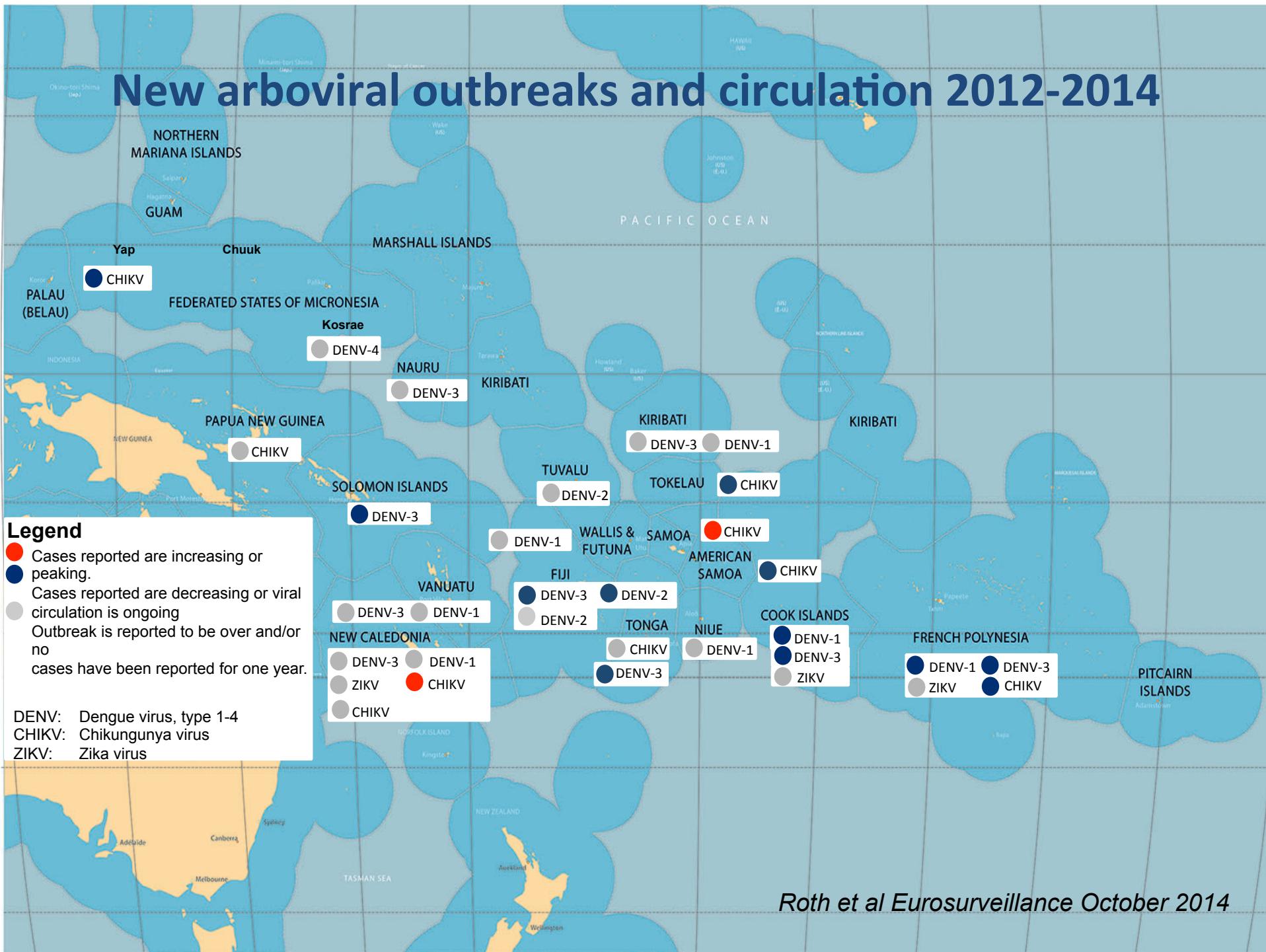
Similarities

- Transmission
- Drivers - socioeconomic, environmental and ecological factors
- Control measures

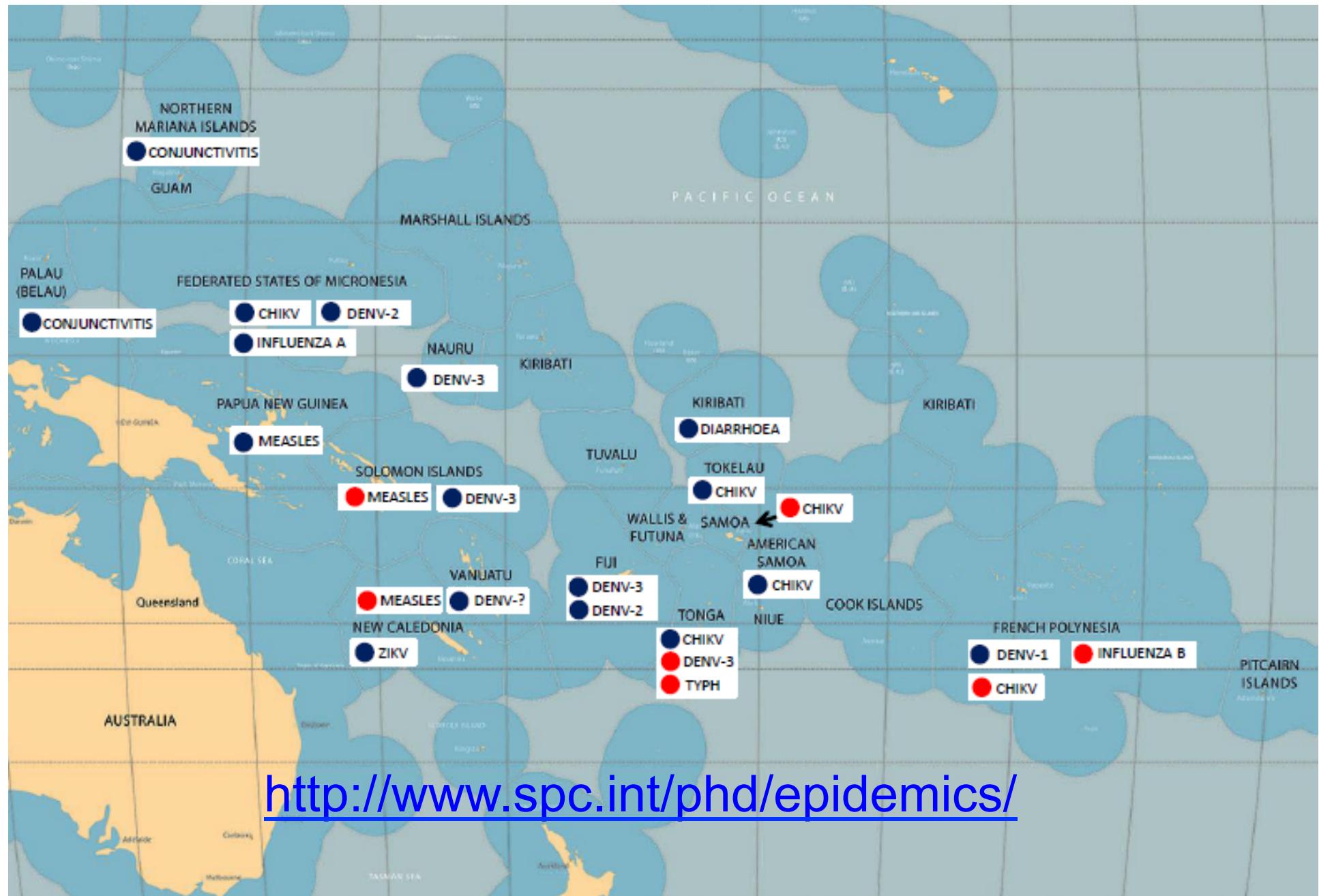
Co-circulation and concurrent outbreaks

- Burden on Pacific people and health systems

New arboviral outbreaks and circulation 2012-2014



Roth et al *Eurosurveillance* October 2014



<http://www.spc.int/phd/epidemics/>



for the Pacific Public
Health Surveillance
Network (PPHSN)

Legend

- Cases reported are increasing or peaking.
- Cases reported are decreasing or viral circulation is ongoing.
- Awaiting confirmation of aetiology.

DENV: Dengue virus
CHIKV: Chikungunya virus
TYPH: Typhoid fever

ZIKV: Zika virus

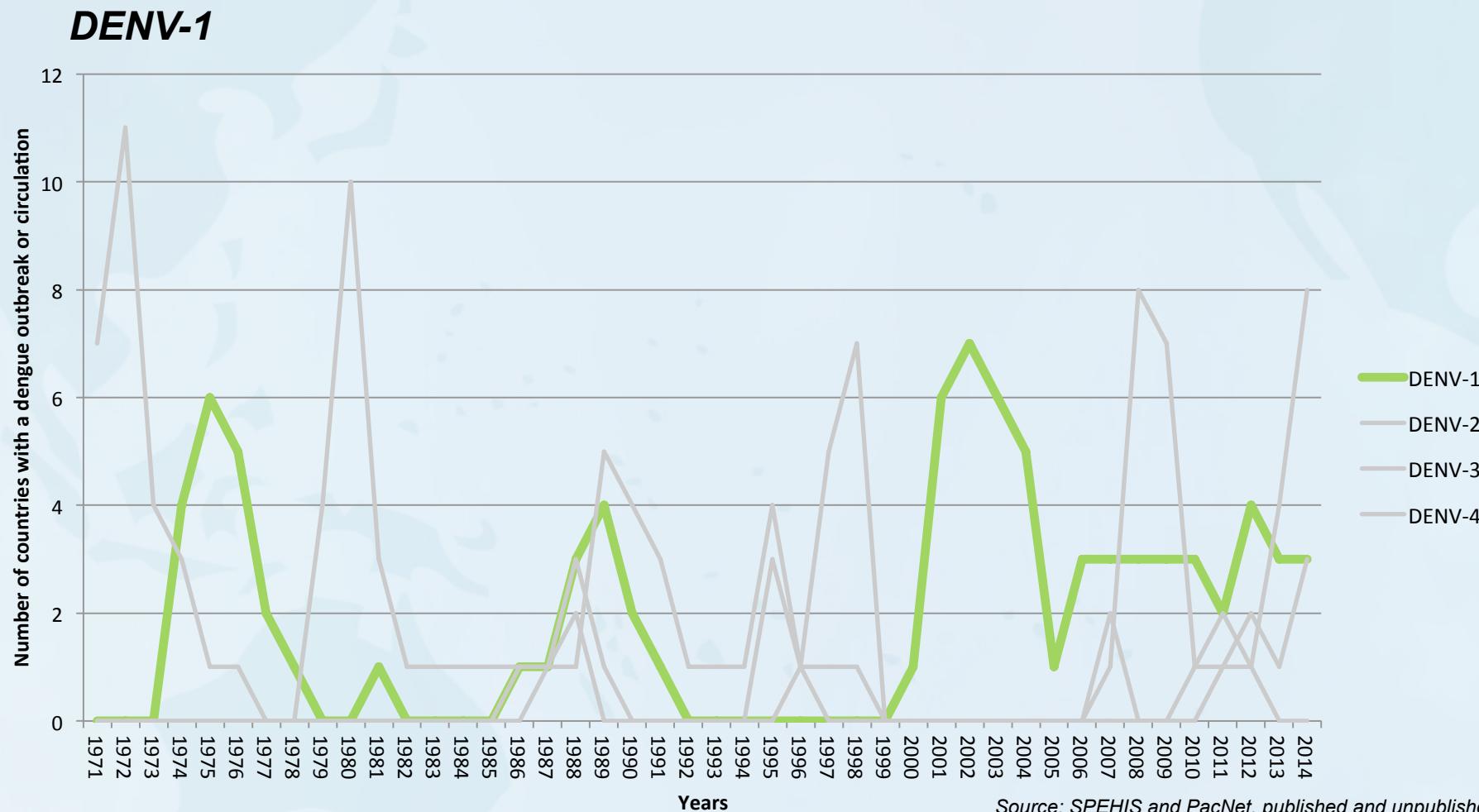


Dengue in the Pacific

- Sporadic/Epidemic pattern
 - Every 4-5 years regional waves
- Outbreaks of all four serotypes in 2012
 - DENV 3 absent for 18 years, re-introduced 2012, now having caused 8 outbreaks, several ongoing



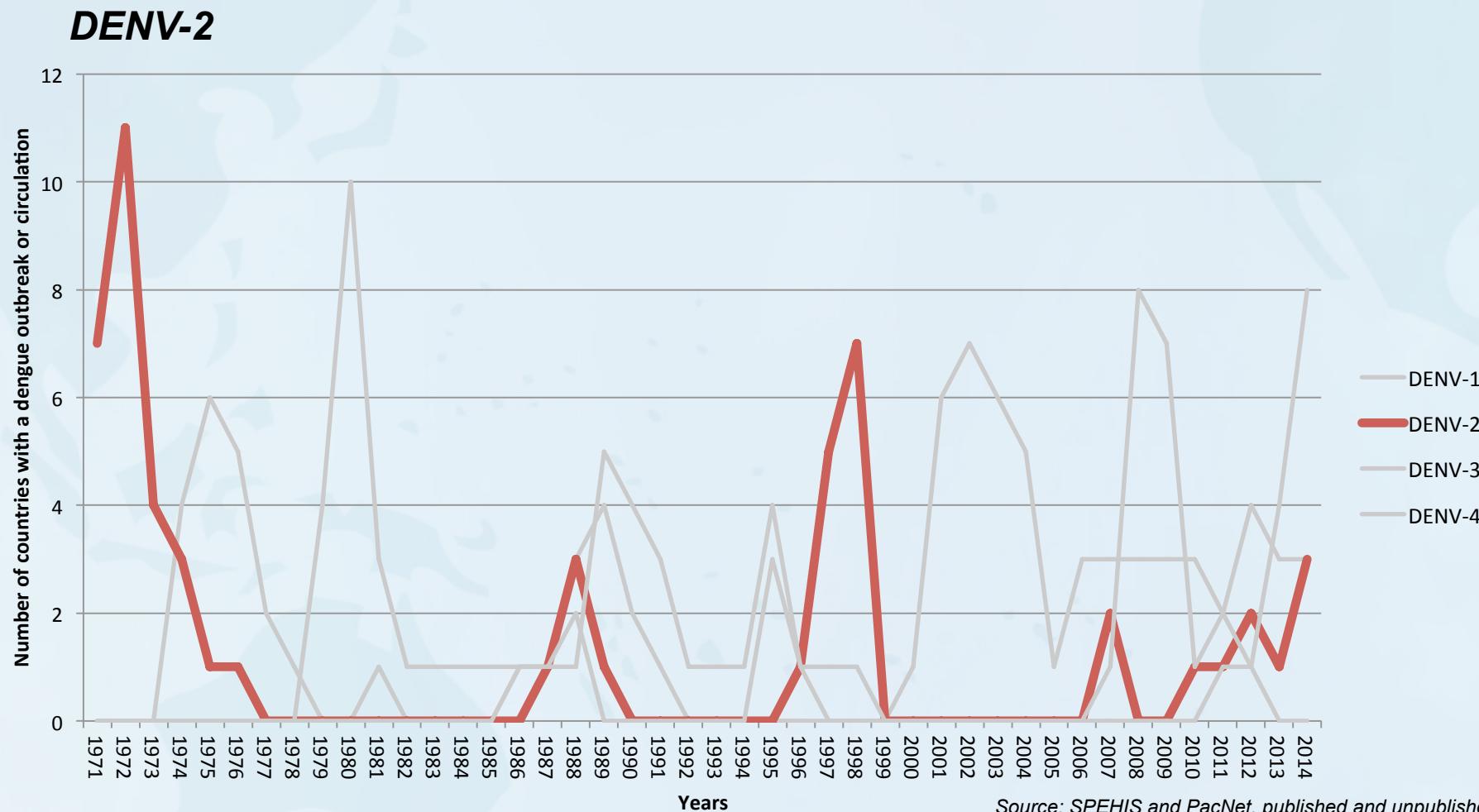
Number of countries with dengue outbreaks or circulation for each serotype from 1971 to 2014



Source: SPEHIS and PacNet, published and unpublished
- Kiedrzynski et al Pac Health Dialogue 1998
- Singh et al Pac Health Surv and Response 2005
- Lepers et al InformAction 2008
- Cao -Lormeau et al EID 2014



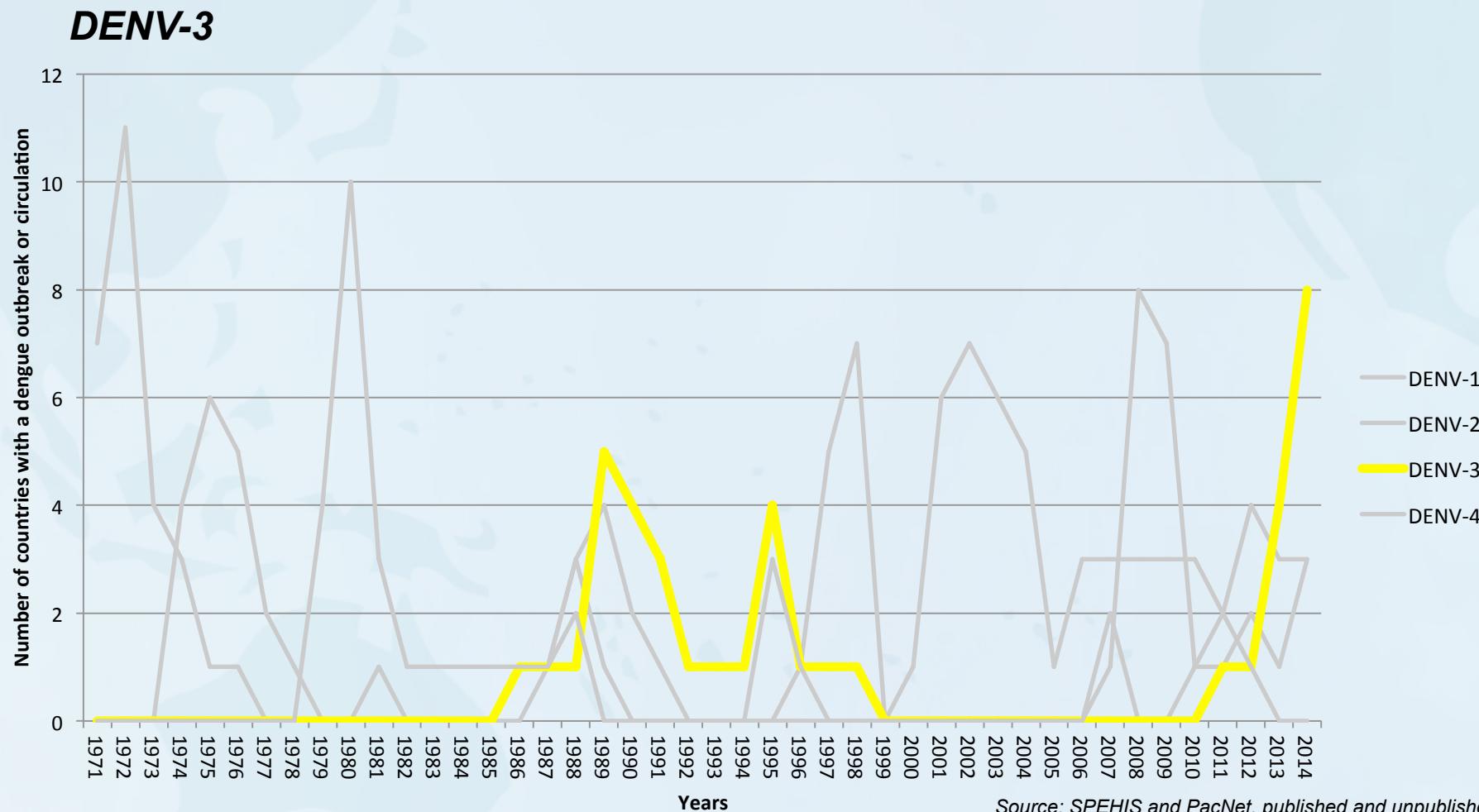
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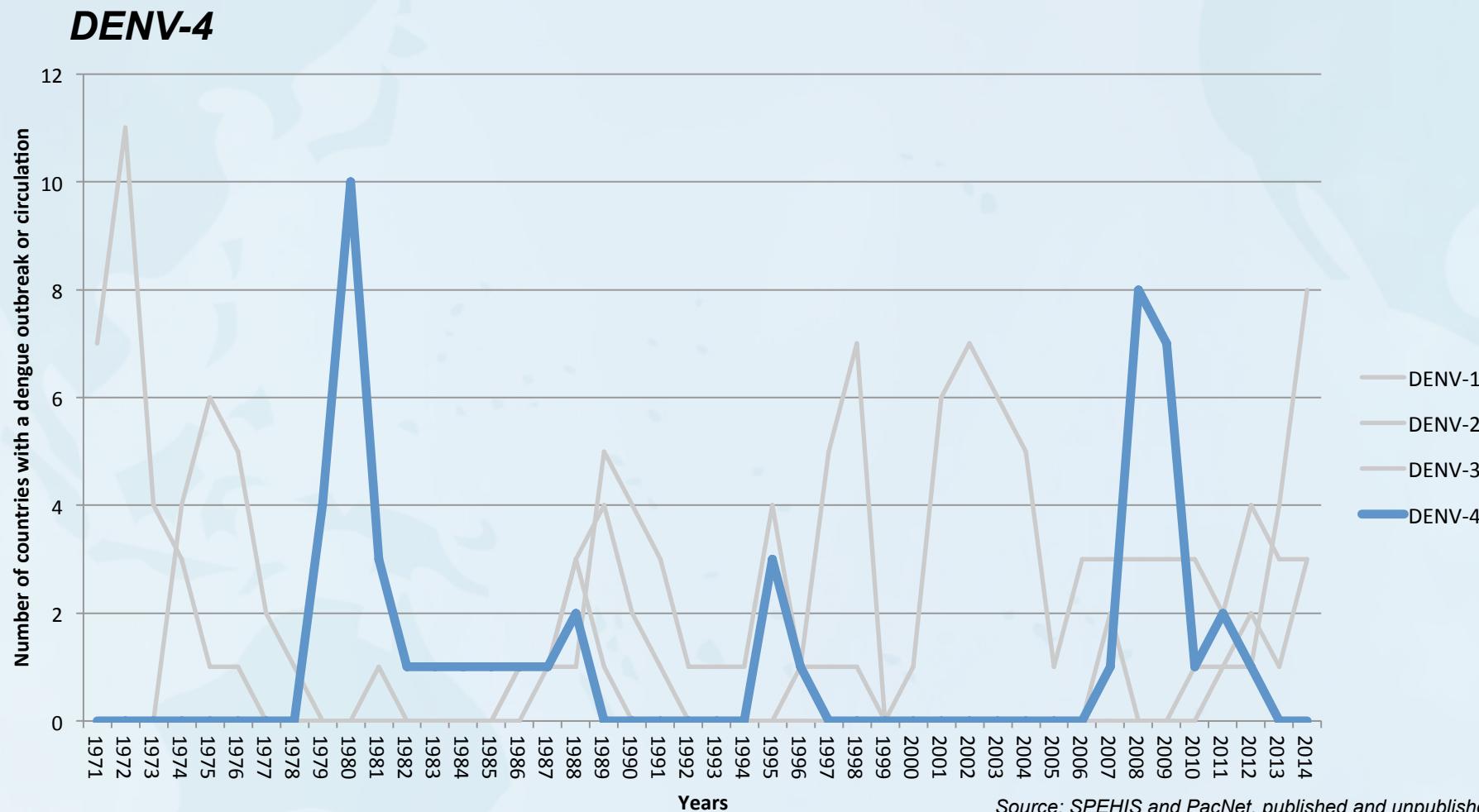
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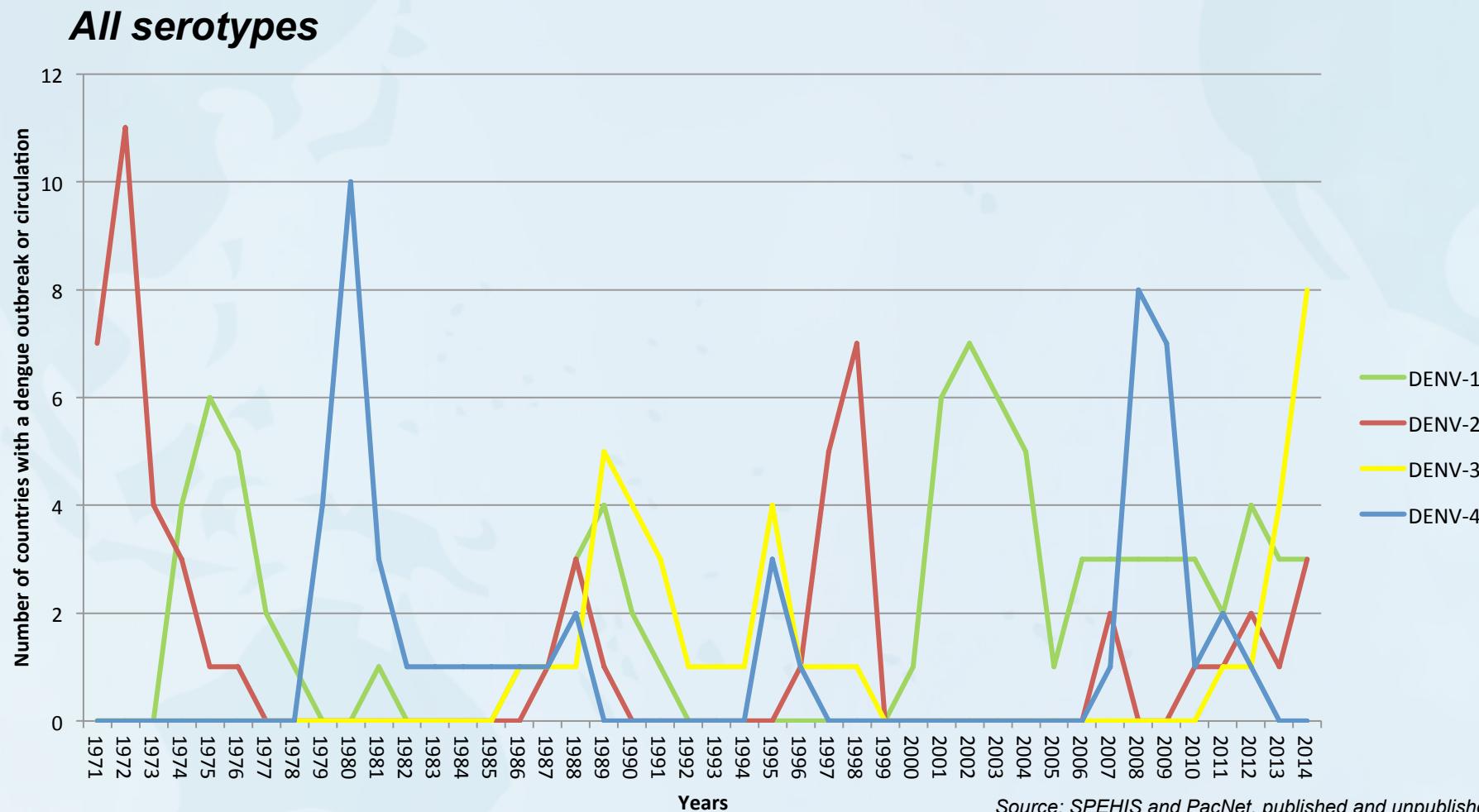
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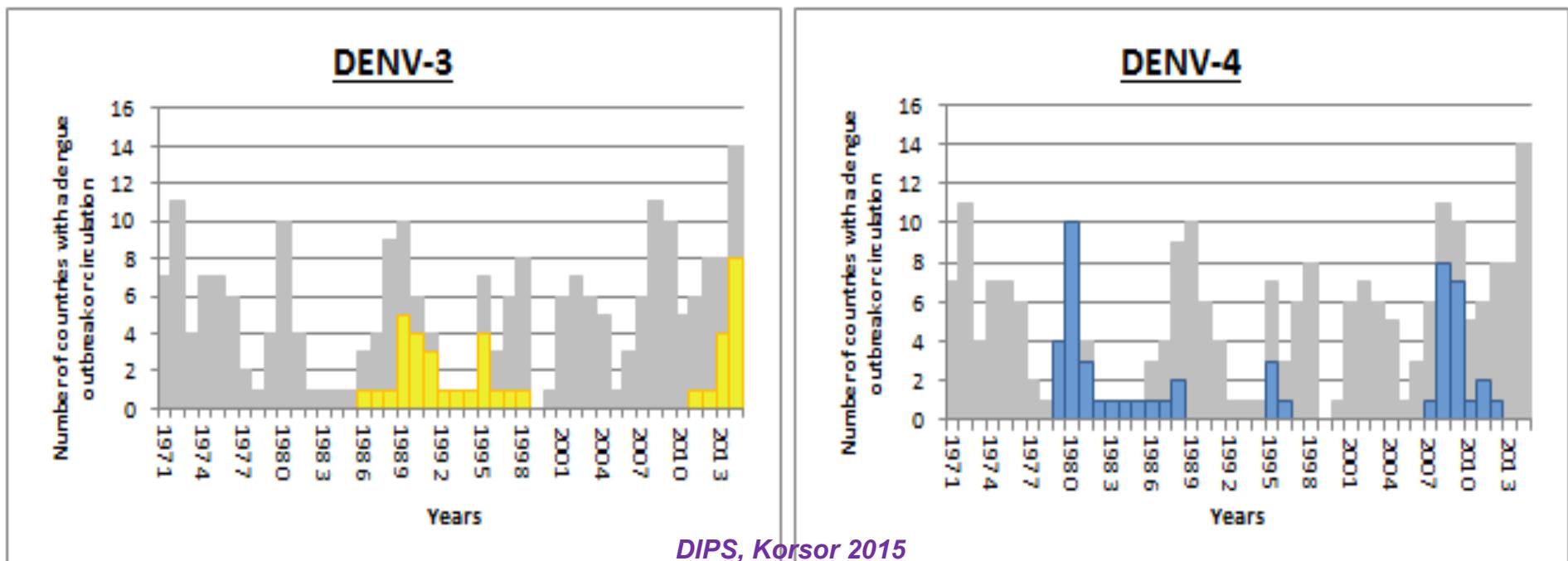
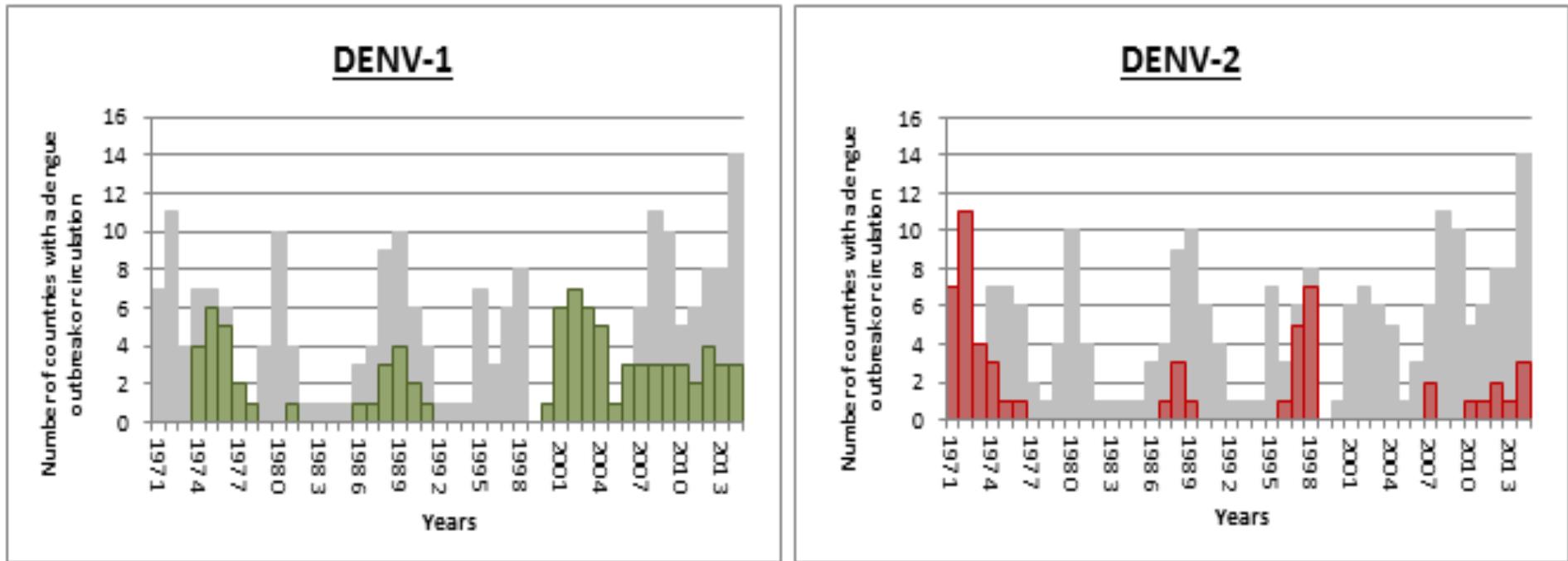
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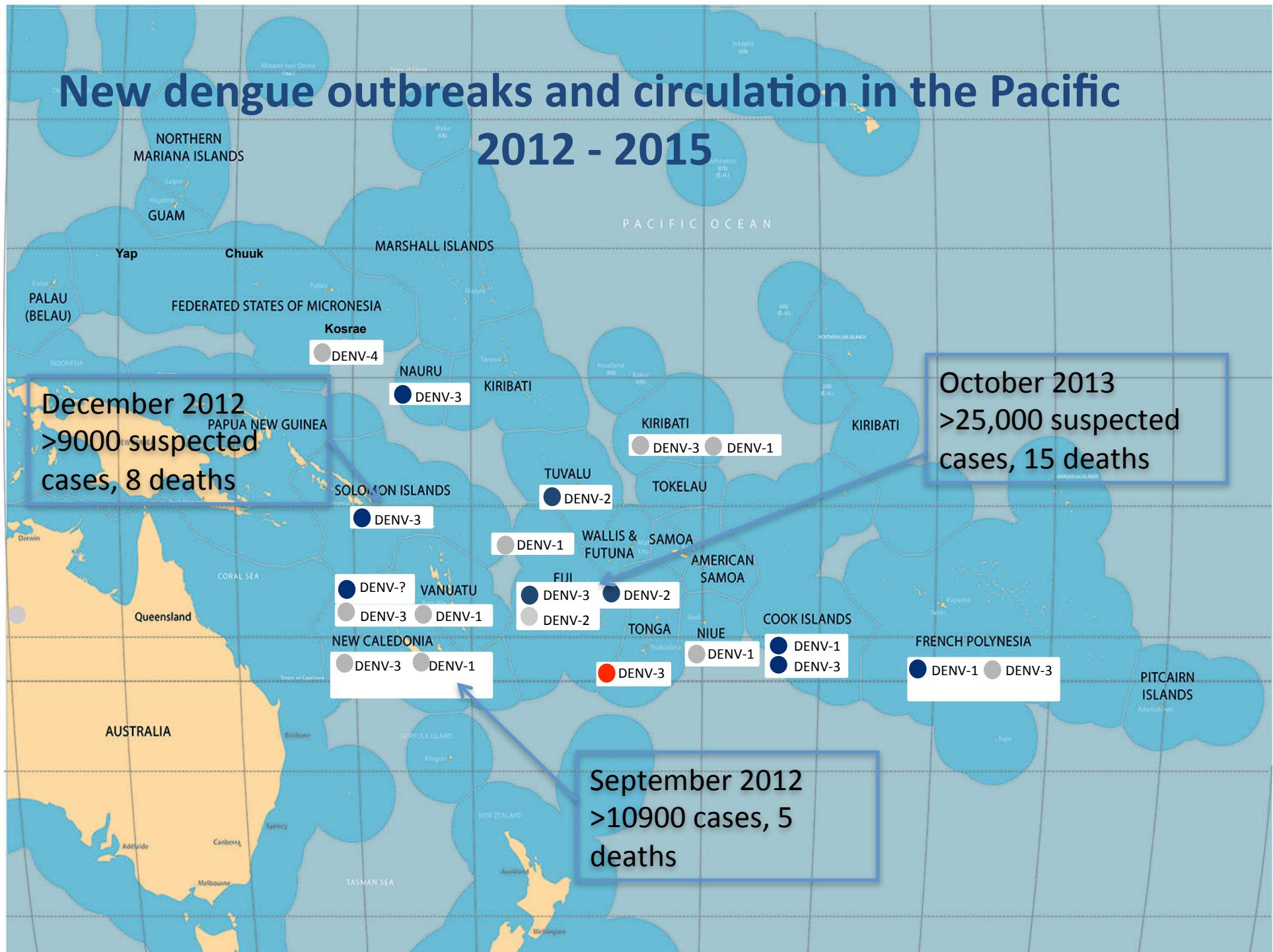


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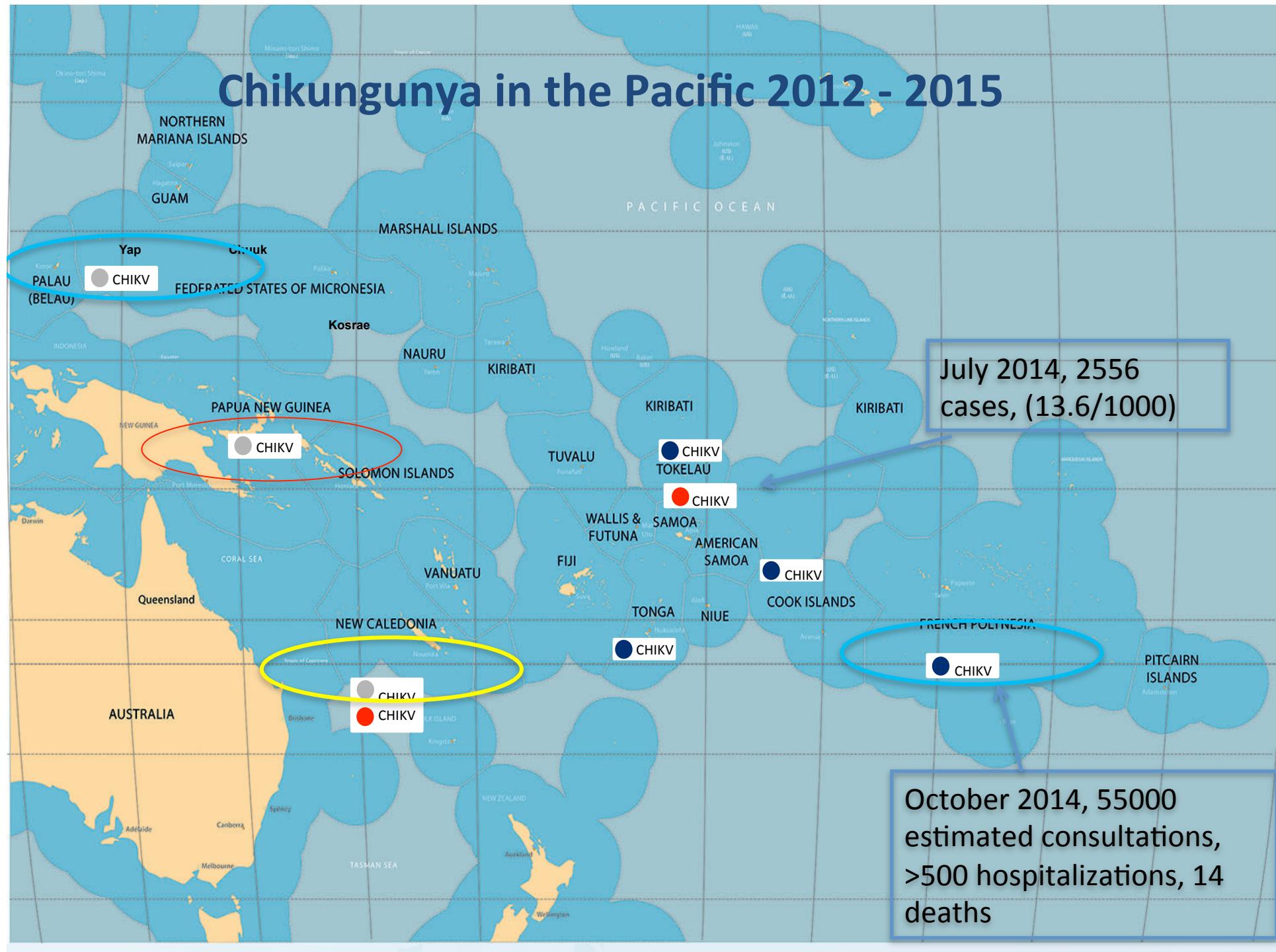
- **Chikungunya in the Indian Ocean**

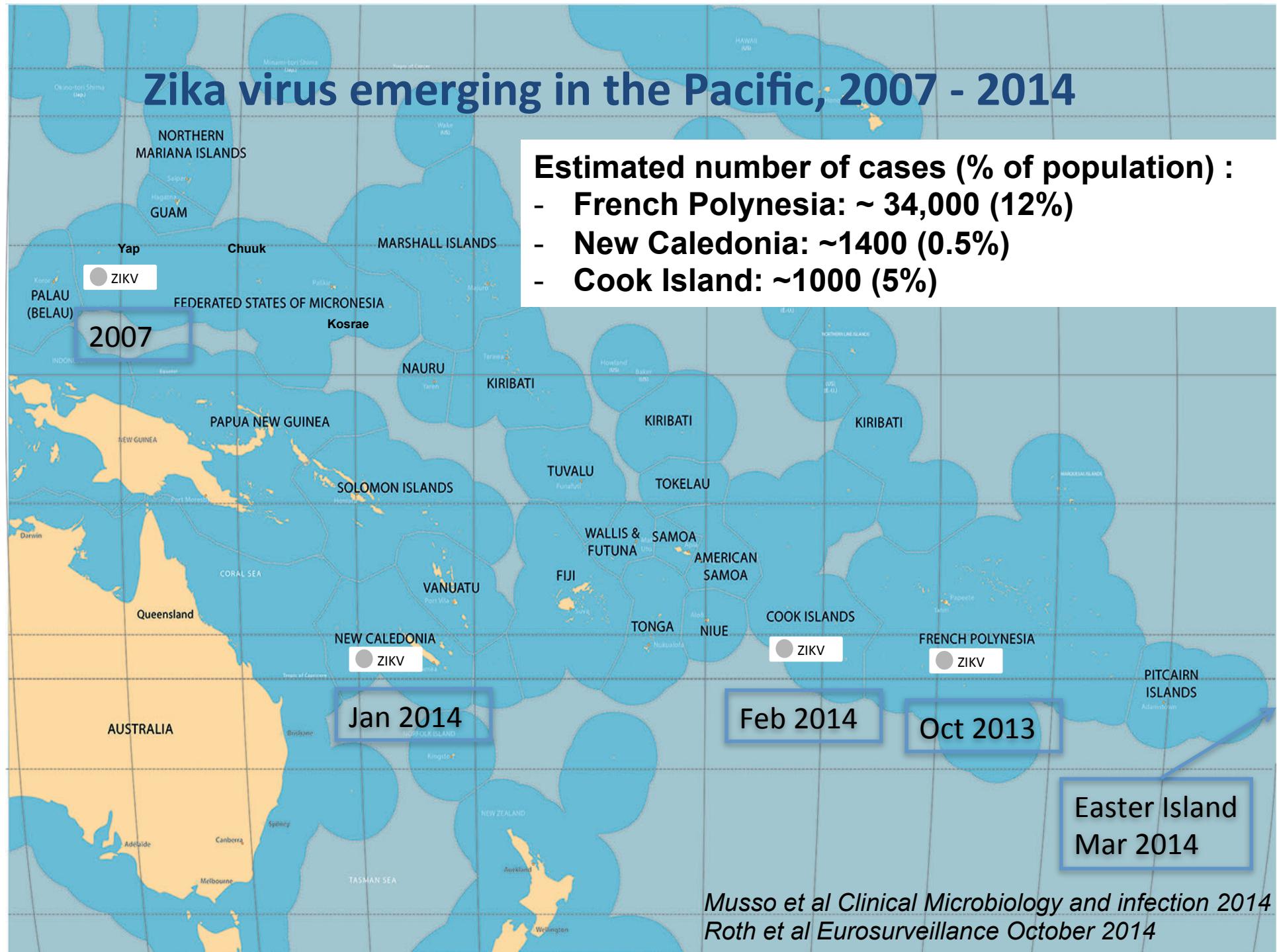
- 2005 – 2007 in Indian Ocean
- Large Burden. Ex Reunion Island:
 - 35% attack rate, medical costs of €43.9 million

- **Chikungunya in the Pacific**

- 1970ies – 30% seroprevalence in PNG and Indonesia??
- Feb 2011 – New Caledonia, Tightly controlled outbreak, 33 cases,
 - Asian lineage
- Jun 2012 – Papua New Guinea, ECSA lineage
- Jan – Jun 2013 – New Caledonia, Asian lineage
- Aug 2013 -> Yap State, Asian lineage
- Feb 2014 -> Tonga
- Jun 2014 -> American Samoa
- Jul 2014 -> Samoa
- Jul 2014 -> Tokelau
- Oct 2014 -> French Polynesia, Asian lineage

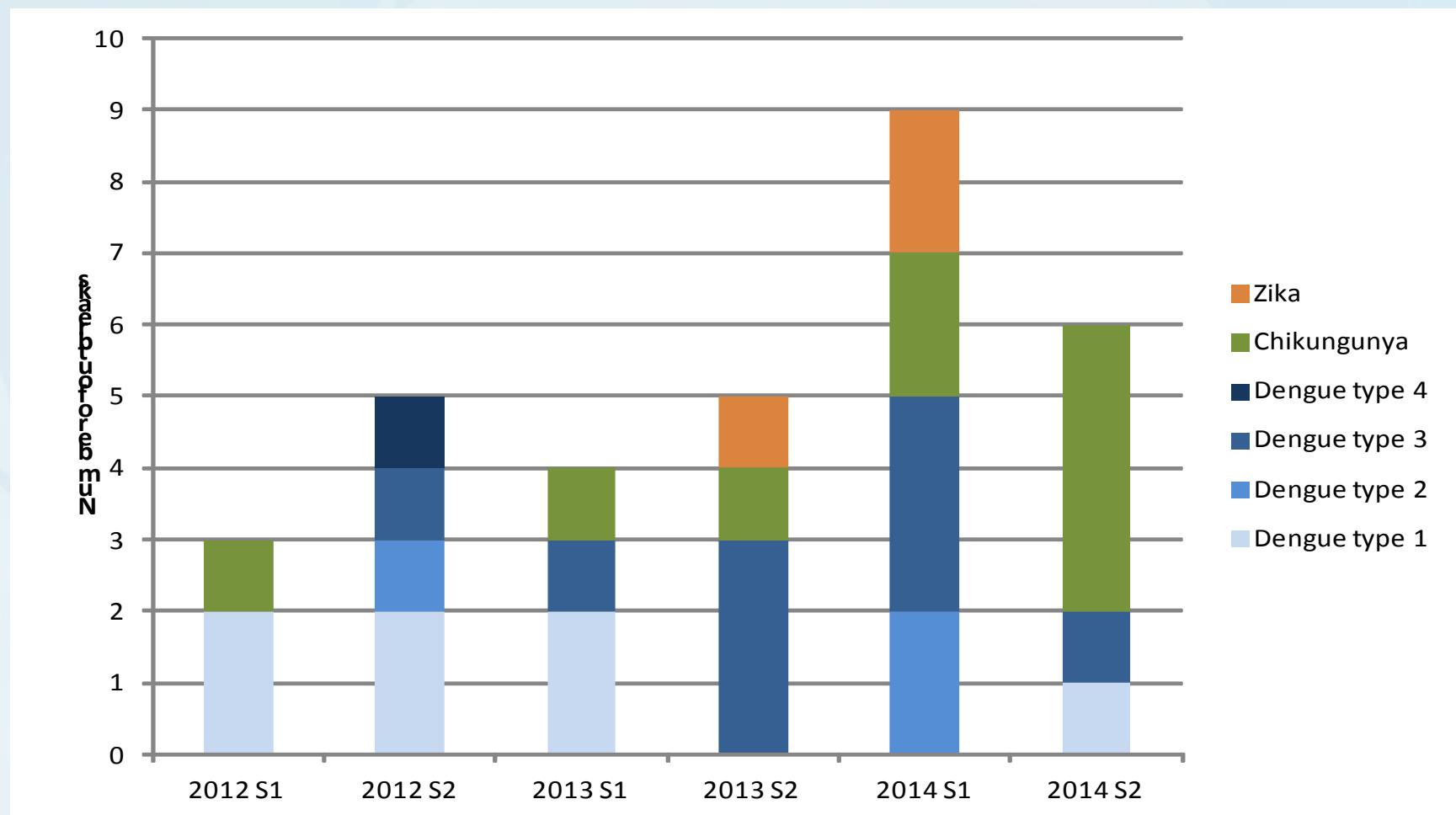
-Kanamitsu et al Am J Trop Med Hyg 1979
-Tesh et al Am J Trop Med Hyg 1975
-Dupont-Rouzeyrol et al Vector Borne Zoonotic Dis 2012
-Horwood et al EID 2013
-Dupont-Rouzeyrol et al 2014
-Dupont-Rouzeyrol /Cau-Lormeau personal communication







New arboviral outbreaks and circulation 2012-2014

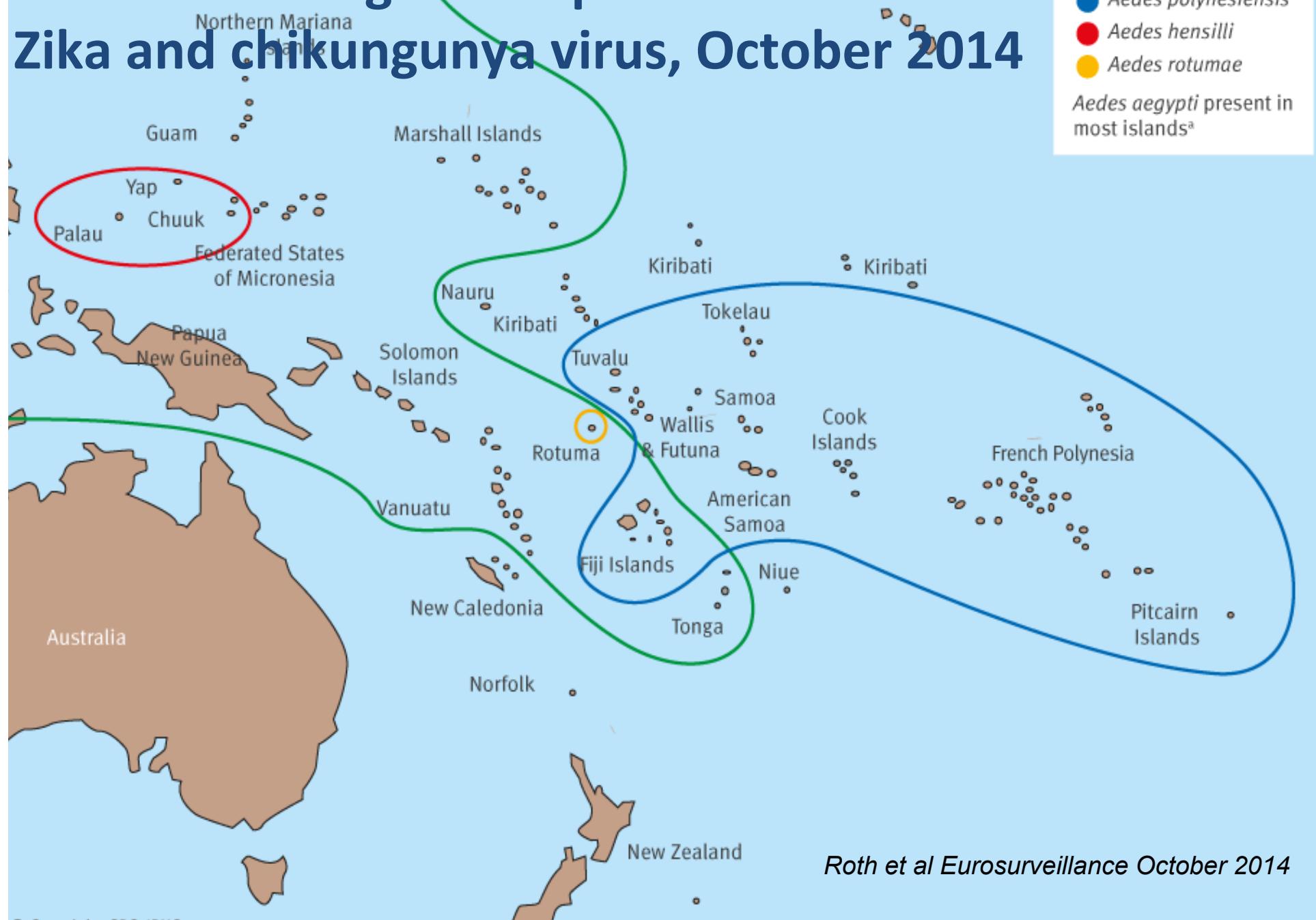




Risk for further spread

- Vectors and a susceptible population

Vectors of dengue and possible vectors of Zika and chikungunya virus, October 2014



Roth et al Eurosurveillance October 2014



Risk for further spread

Vectors and a susceptible population

Global trend of increasing vector borne disease

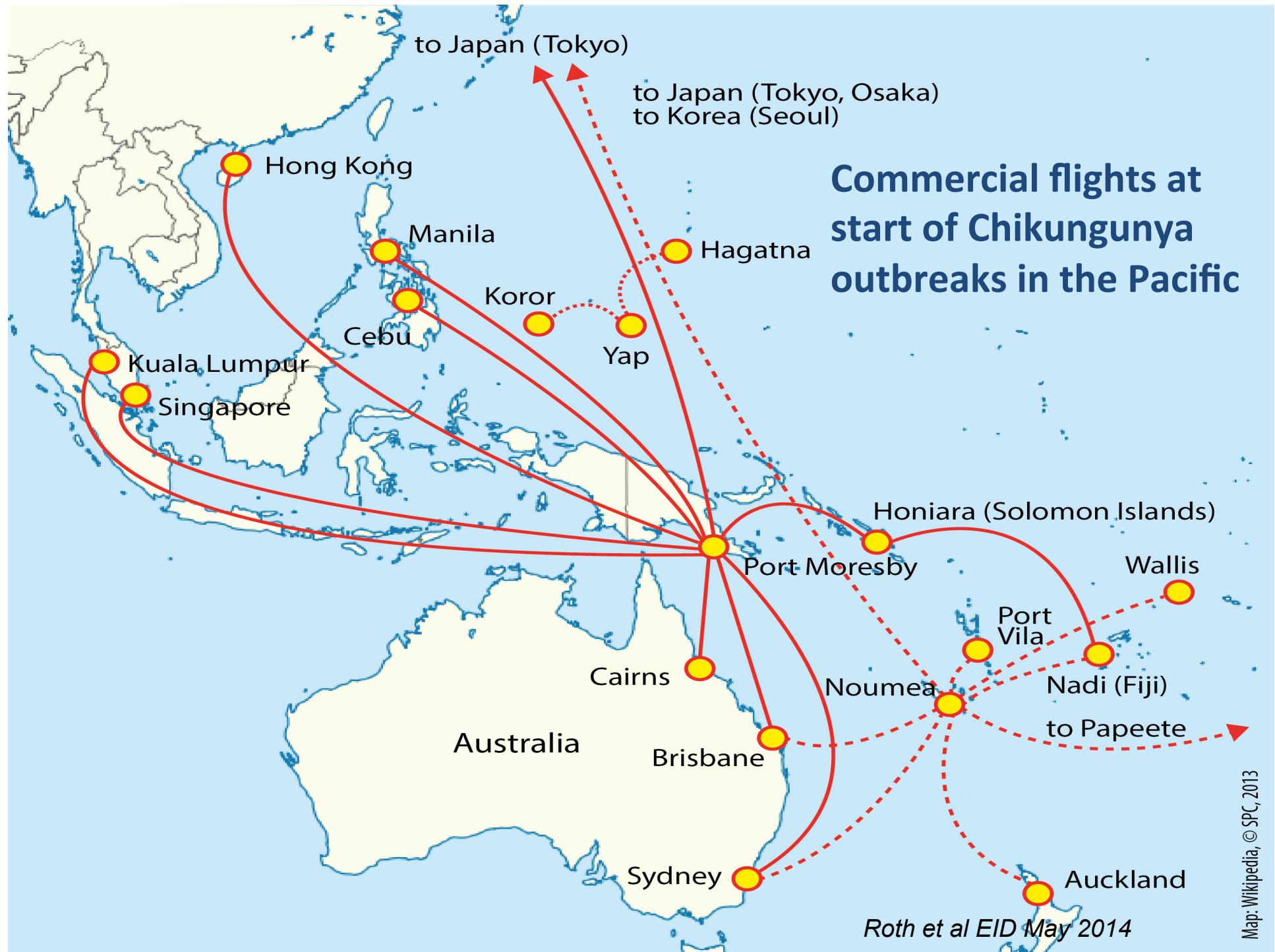
- Re-emergence of dengue in Japan
- Chikungunya and dengue in Europe
- Chikungunya for the first time in the Americas

Concurrent outbreaks

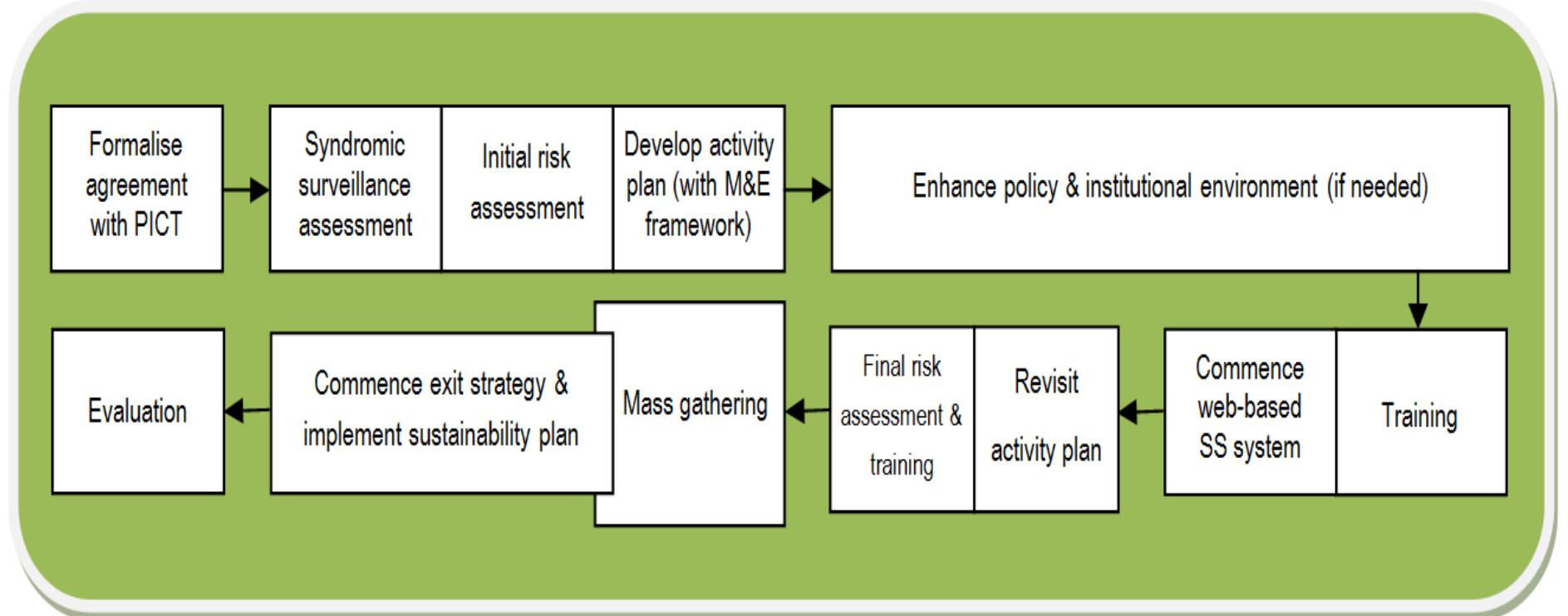
- Important with continuous (limited) sampling during outbreaks
- Circulation for a long time

Drivers

- Urbanisation
- Globalization
- Climate Change – remains to be demonstrated



Mass-gathering surveillance



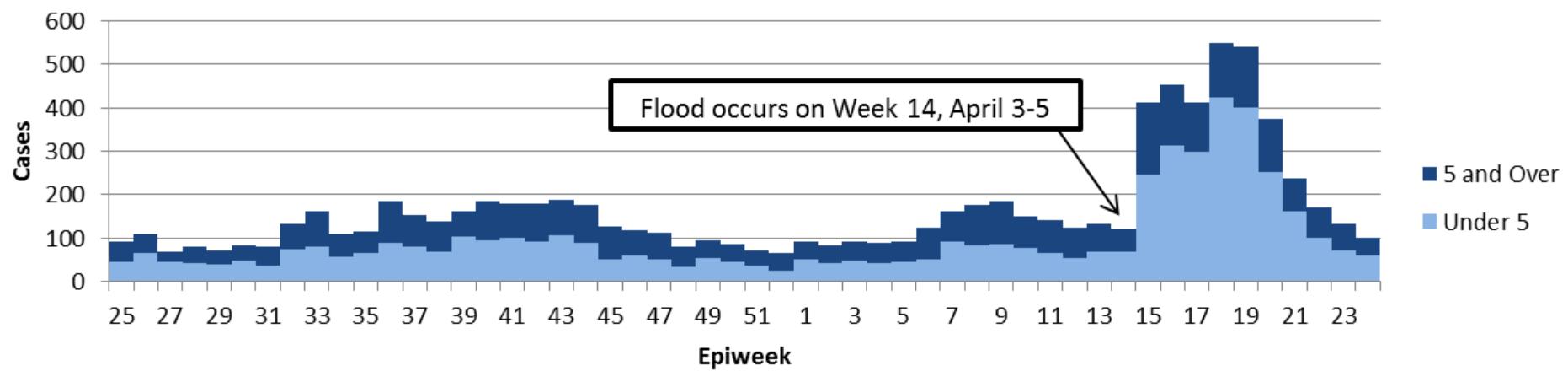
Hoy et al unpublished



Solomon Islands – flash floods

April 2014

**Watery Diarrhea Cases in Honiara, Age Stratified
(June 2013 - June 2014)**



*Forrest Jones, Yale SPH MPH Student

Post disaster surveillance –

EWARN

Early Warning Epidemic Surveillance Reporting Form

Ministry of Health, Vanuatu, 2015

Health Center:	Date of week beginning: _____ / _____ / _____	Date of week ending: _____ / _____ / _____	
	< 5 Years	5 + Years	TOTAL
Acute fever and rash <i>Case definition: Fever plus rash</i>			
Prolonged fever <i>Fever for 3 days or more</i>			
Influenza-like illness <i>Fever plus cough or sore throat</i>			
Watery diarrhea <i>3 or more loose or watery stools in 24 hours (non-bloody)</i>			
Bloody diarrhea <i>Any episode of acute bloody diarrhea</i>			
Acute jaundice syndrome <i>Jaundice (yellow eyes or dark urine) AND severe illness with or without fever</i>			
Malaria <i>Clinically suspected malaria + positive RDT or MPS</i>			
Suspected dengue <i>Fever plus 2 of following: 1) Aches and pains (headache, eye pain, muscle/joint pain); 2) Lack of appetite, nausea or vomiting; 3) Rash; 4) Tourniquet sign; 5) Bleeding from nose or gums; 6) Abdominal pain; 7) Lethargy or restlessness</i>			
1 patient = 1 diagnosis			

Unexpected events: _____

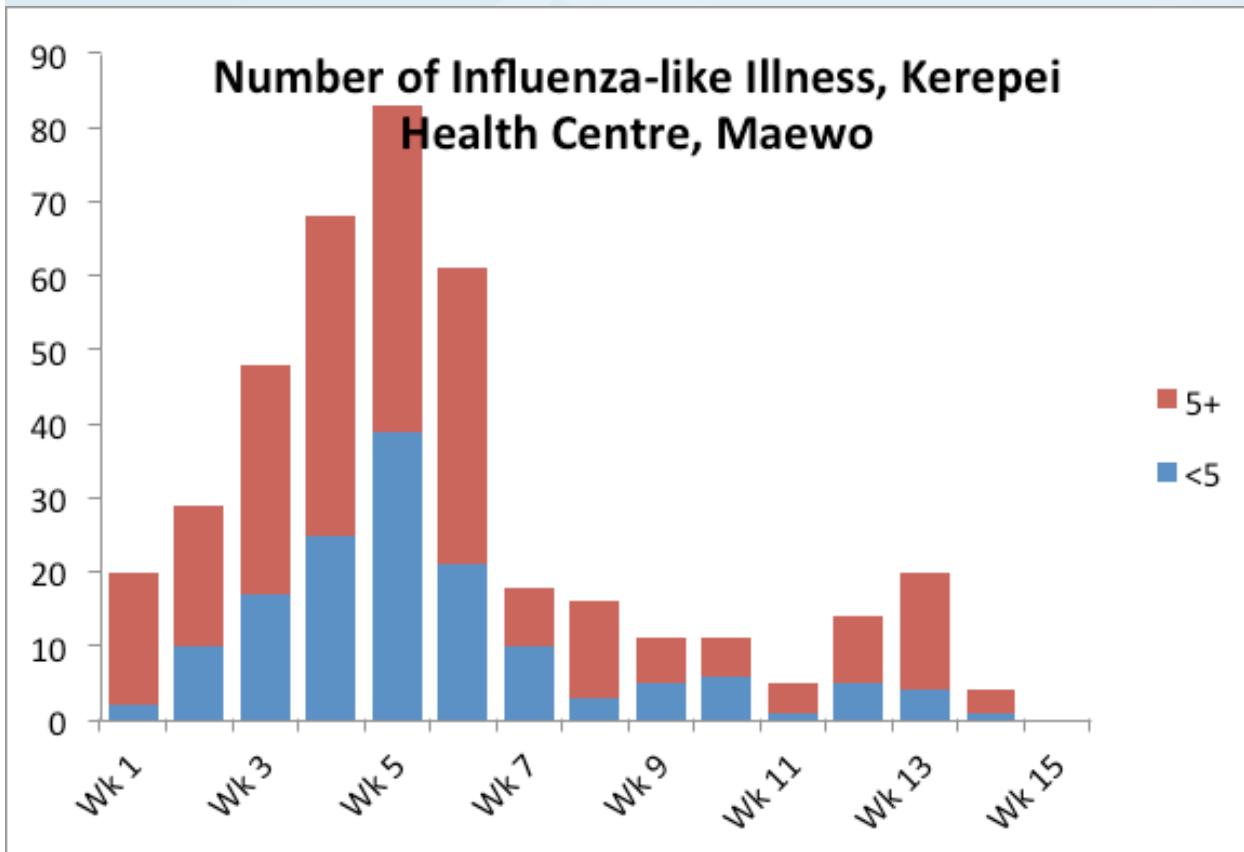
DATE _____ / _____ / _____

NAME: _____

Total number of consultations for week _____
For immediate reporting contact George Worwor (phone: 27683; email: g.worwor@vanuatu.gov.vu)



Post disaster surveillance – EWARN





The graphic features a blue header with the logo of PPHSN & ROSSP (Pacific Partnership for Health Sector Strengthening and Response to HIV/AIDS) and a stylized palm tree icon. Below the header, the text reads:

Data for decision-making (DDM) accredited training programme for the Pacific

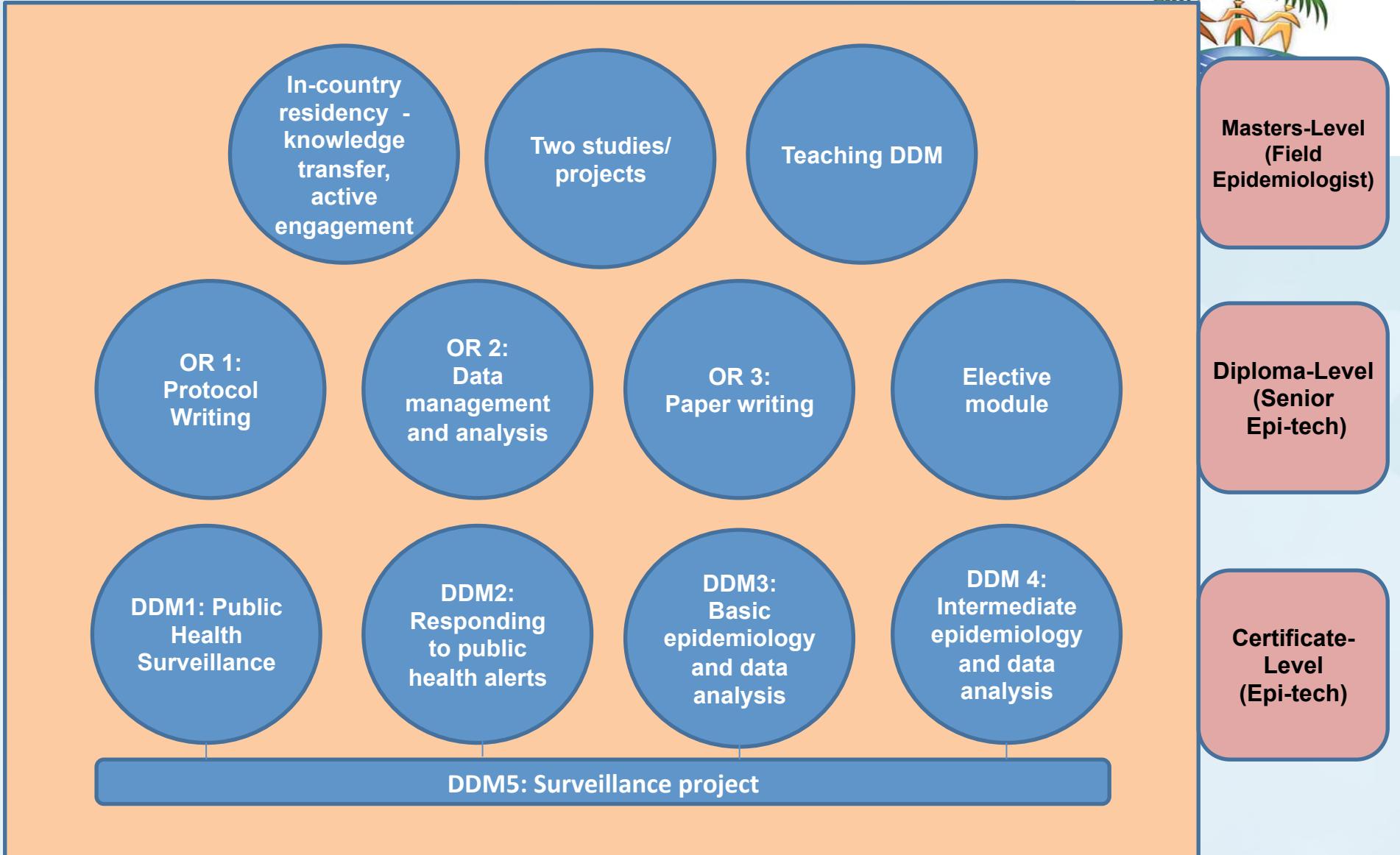
The background of the main section shows a tropical island scene with clear blue water and green trees. In the bottom right corner, there is a collage of four smaller photographs illustrating various health-related activities: a scientist in a lab, two people working at a computer, a medical consultation, and a group of people in a community setting.

At the bottom, there is a large graphic of a stethoscope resting on a document titled "Data for decision-making (DDM)" which contains several bar charts and graphs. Logos for SPC, FNU, CDC, NSW, and WHO are at the very bottom.



Data for Decision-Making (DDM)

- **Module 1** – Outbreak surveillance and response
 - 14 PICTs (120 students) in 2013-2014
- **Module 2** – Basic applied epidemiology and data analysis (in-country data)
 - 7 PICTs (50 students) in 2014
- **Module 3** – Intermediate epi and data analysis
 - 6 PICTs (26 students) in 2014
- **Module 4 and own data project** - 2015





Pacific OR course

Public Health Action

VOL 4 SUPPLEMENT 1 PUBLISHED 21 JUNE 2014

International Union Against Tuberculosis and Lung Disease
Health solutions for the poor



Tuberculosis case burden and treatment outcomes in children,

Characteristics of government workers and association

with diabetes mellitus

K. Tairea,¹ B. in Ebeye, Republic of the Marshall Islands

Screening for tuberculosis and LTBI in diabetes patients, ¹ J. R. Langidrik⁶

Pohnpei, Federated States of Micronesia

R. R. De Tuberculosis notifications, characteristics and treatment
outcomes: urban vs. rural Solomon Islands, 2000–2011

Sputum smear microscopy referral rates and turnaround

time in the Tonga Islands

Burden and spectrum of disease in people with diabetes

Describing the burden of non-communicable disease risk
factors among Profile of tuberculosis patients with delayed sputum smear
conversion in the Pacific island of Vanuatu

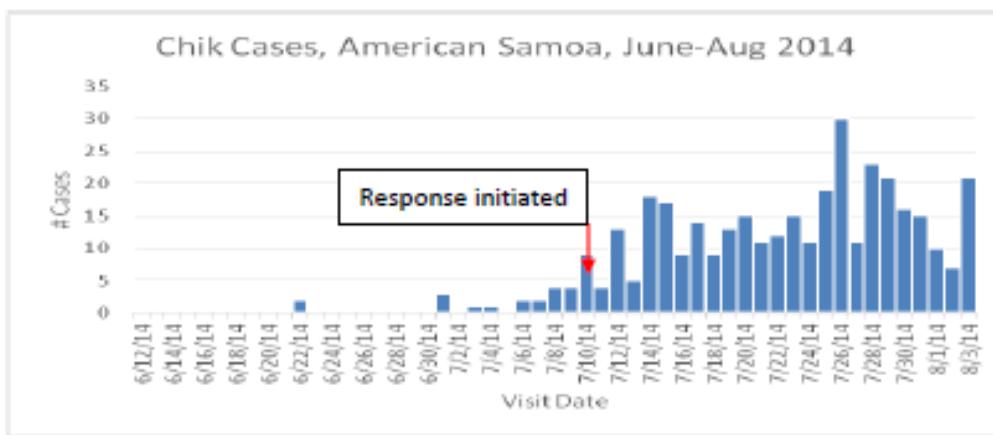
N. Girin,¹ R. Bros S. Fanai,¹ K. Viney,² L. Tarivonda,³ C. Roseveare,⁴ M. Tagaro,¹ B. J. Marais⁵



Situation Report, Chikungunya Outbreak, American Samoa- August 4, 2014

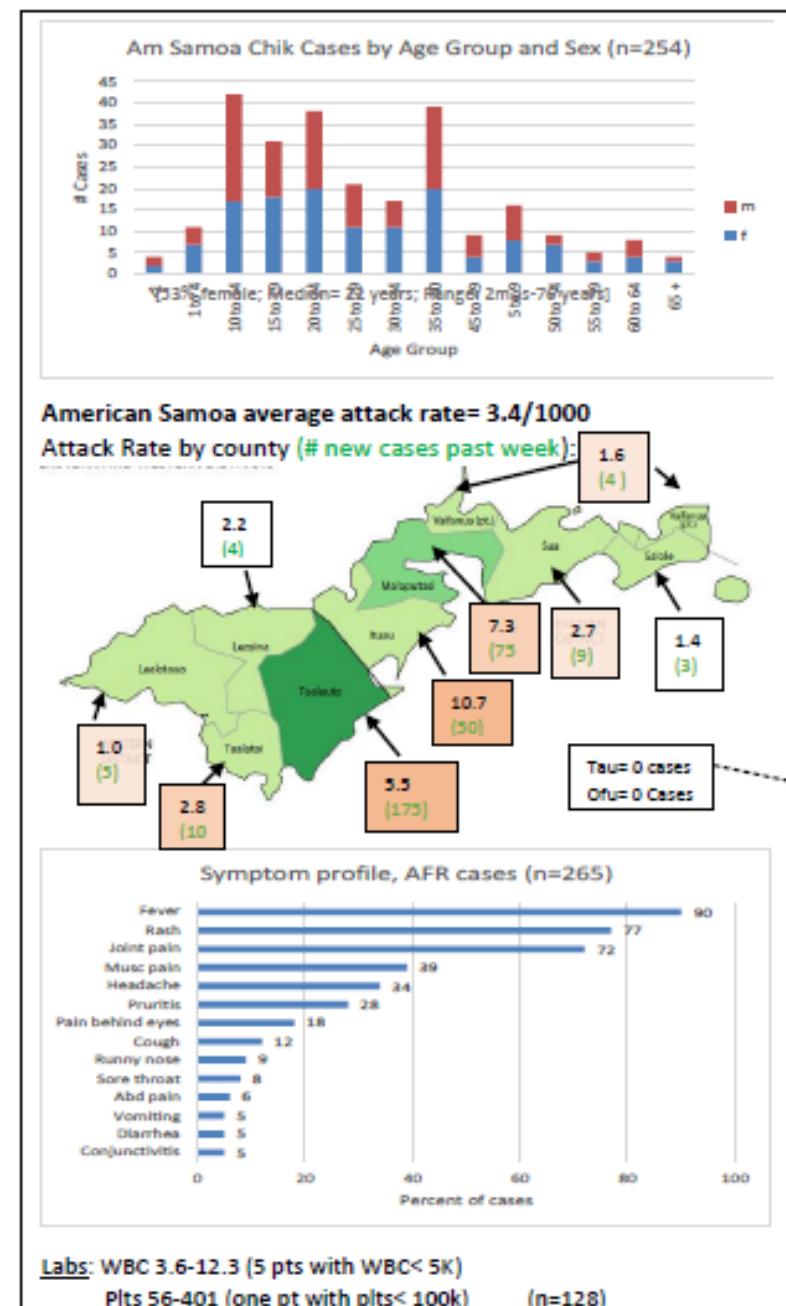
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Thanks to

- PICTs for surveillance work, country reports and PacNet activity
- PPHSN partners for supporting surveillance and outbreak investigation work
- L1 laboratories for sampling and shipping
- L2 and L3 laboratories for genotyping: Institut Pasteur New Caledonia (IPNC), Institut Louis Malarde (ILM) Tahiti French Polynesia, CDC Atlanta US, CDC Puerto Rico, Hawaii State Laboratory (HSL)
- SPC colleagues for helping with material

