

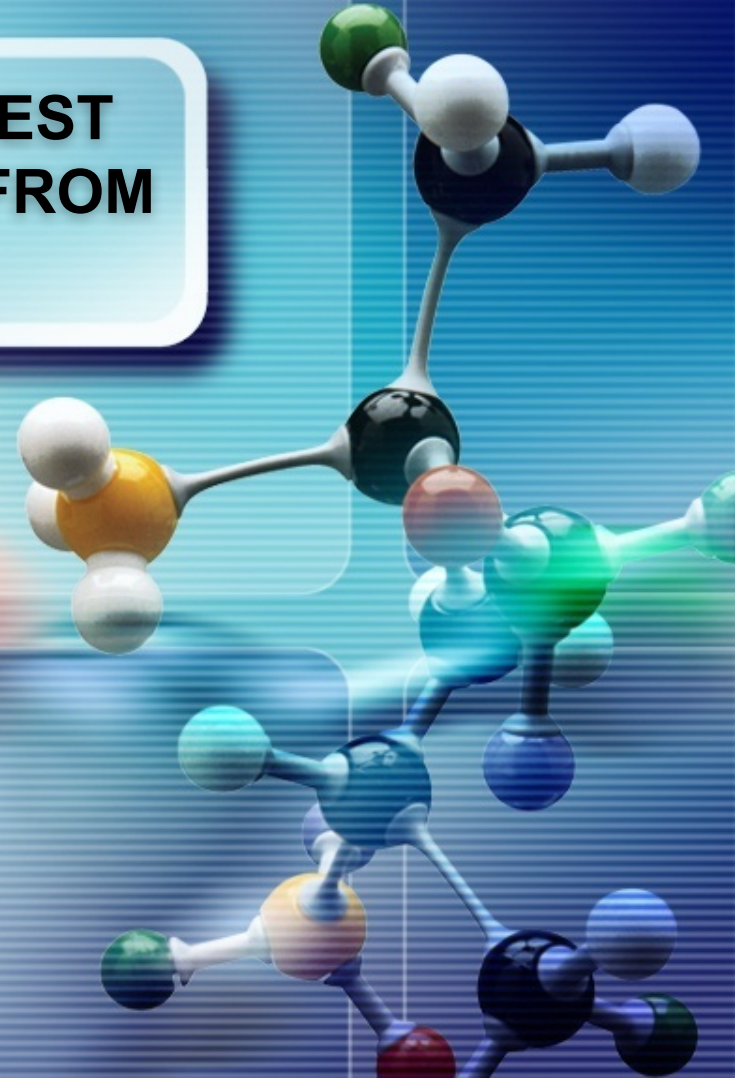
# **DENGUE VIRUSES ISOLATED FROM WEST AUSTRALIA TRAVELLERS ENTERING FROM ASIA-PACIFIC REGION, 2016**

**HARAPAN**

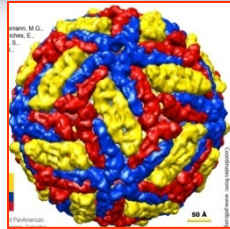
School of Biomedical Sciences  
The University of Western Australia

**SUPERVISORS:**

Associate Professor Allison Imrie  
Professor David Smith  
Professor John Mackenzie  
Dr. Tedjo Sasmono

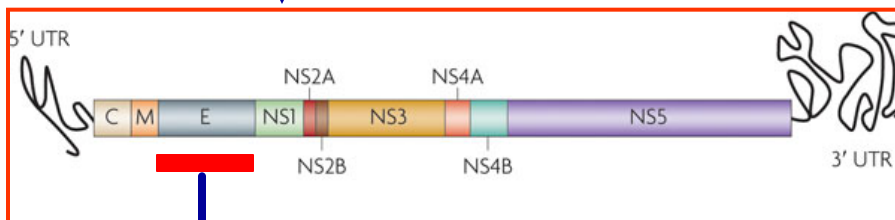


# DENGUE: INTRODUCTION



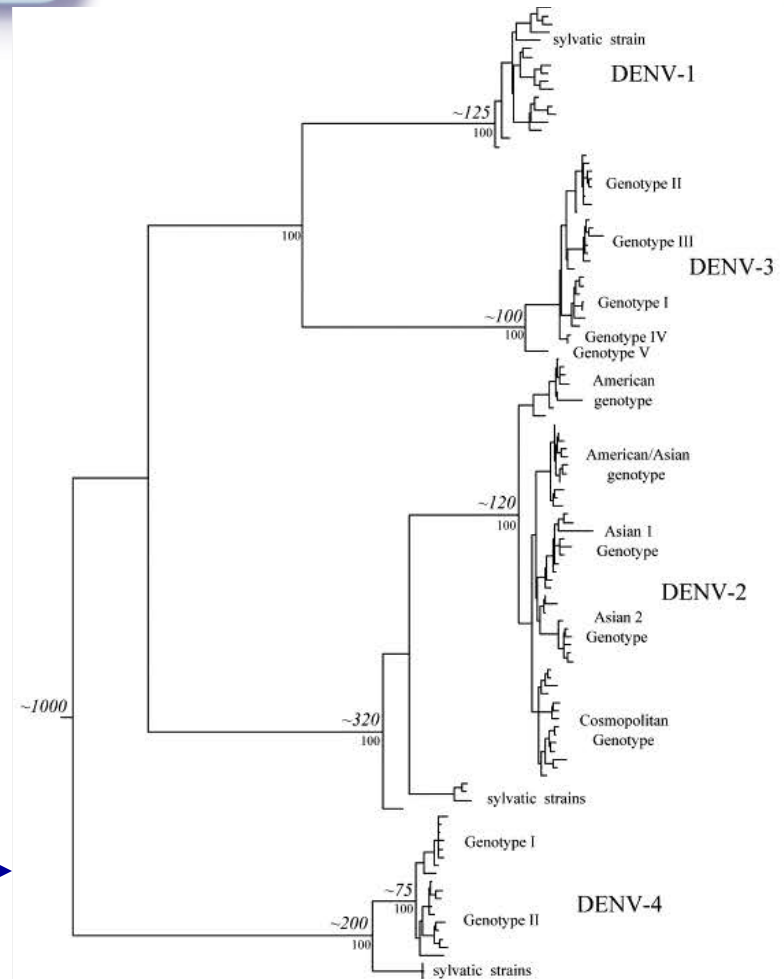
*Aedes Aegypti/ Ae. albopictus*

**Flavivirus**



**The most variable region**

**DENV Classification**



Kuhn RJ et al. Structure of dengue virus: implications for flavivirus organization, maturation, and fusion. *Cell*. 2002 Mar 8;108(5):717-25. Guzman MG et al. Dengue: a continuing global threat. *Nat Rev Microbiol*. 2010 Dec;8(12 Suppl):S7-16. Holmes EC, Twiddy SS. The origin, emergence and evolutionary genetics of dengue virus. *Infect Genet Evol*. 2003 May;3(1):19-28.

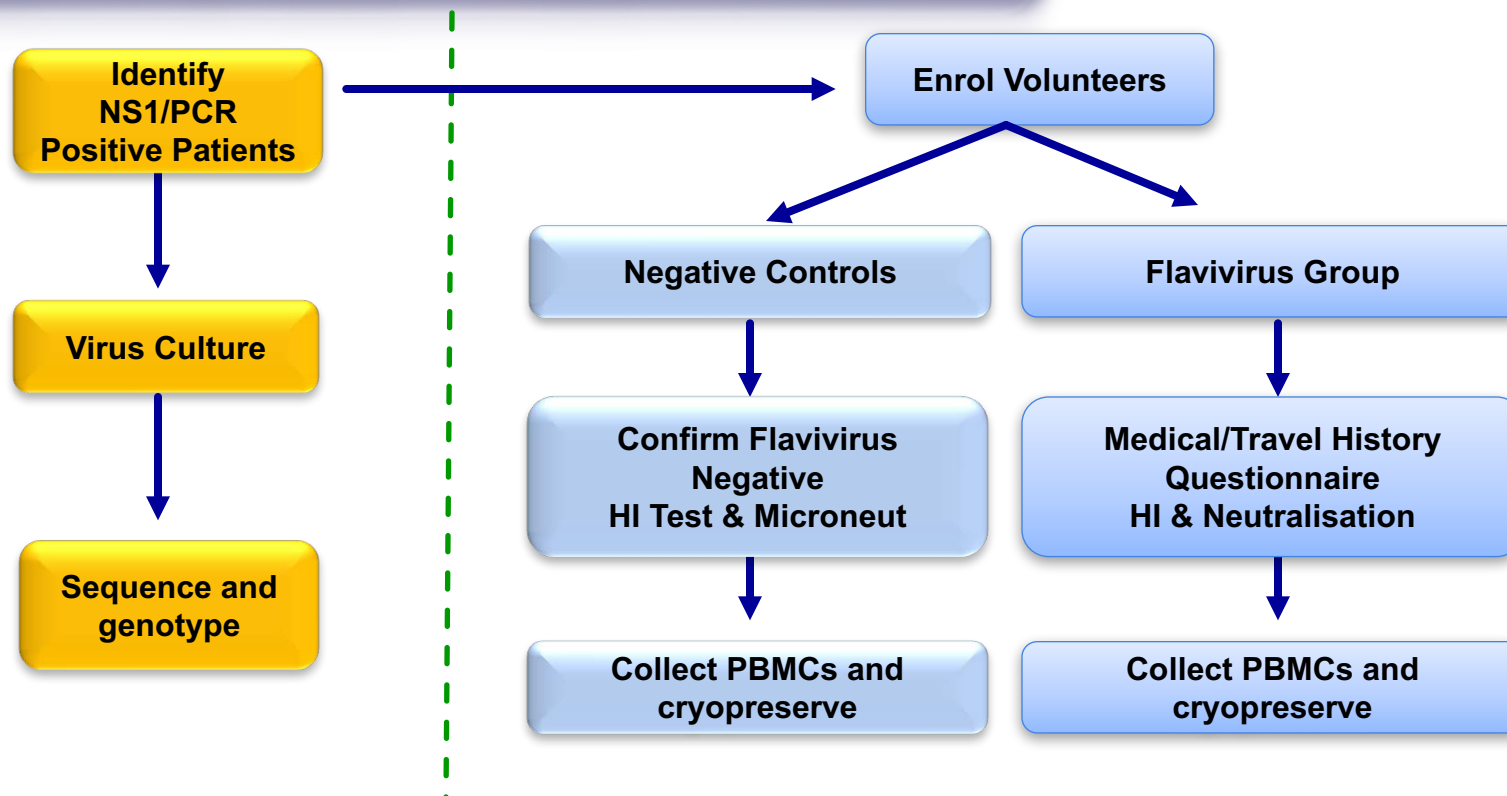


## REGIONALS AFFECTED BY DENGUE VIRUS



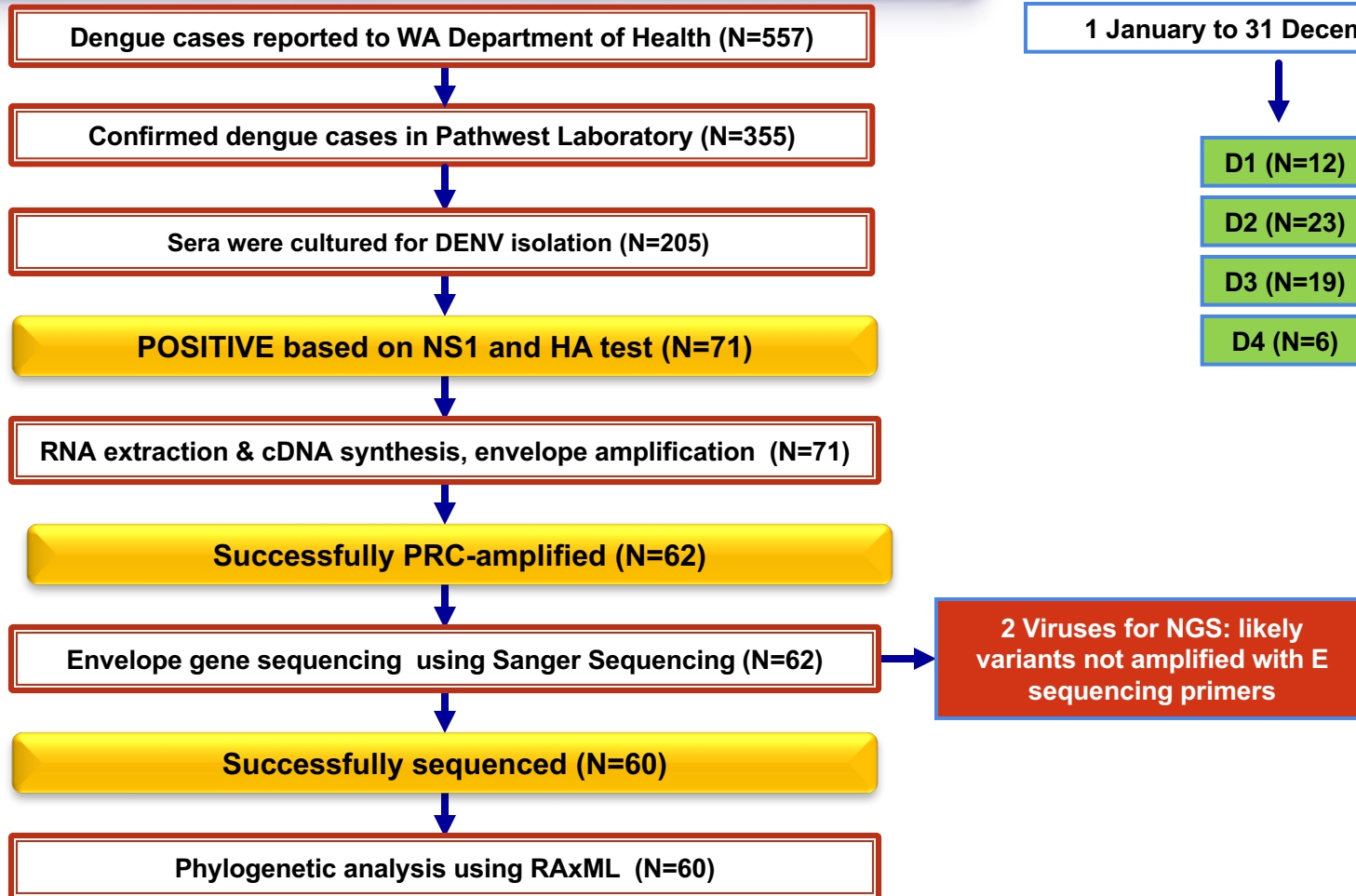
WHO. Dengue, countries or areas at risk, 2011 Geneva, 2012.

# WESTERN AUSTRALIA TRAVELLERS STUDY

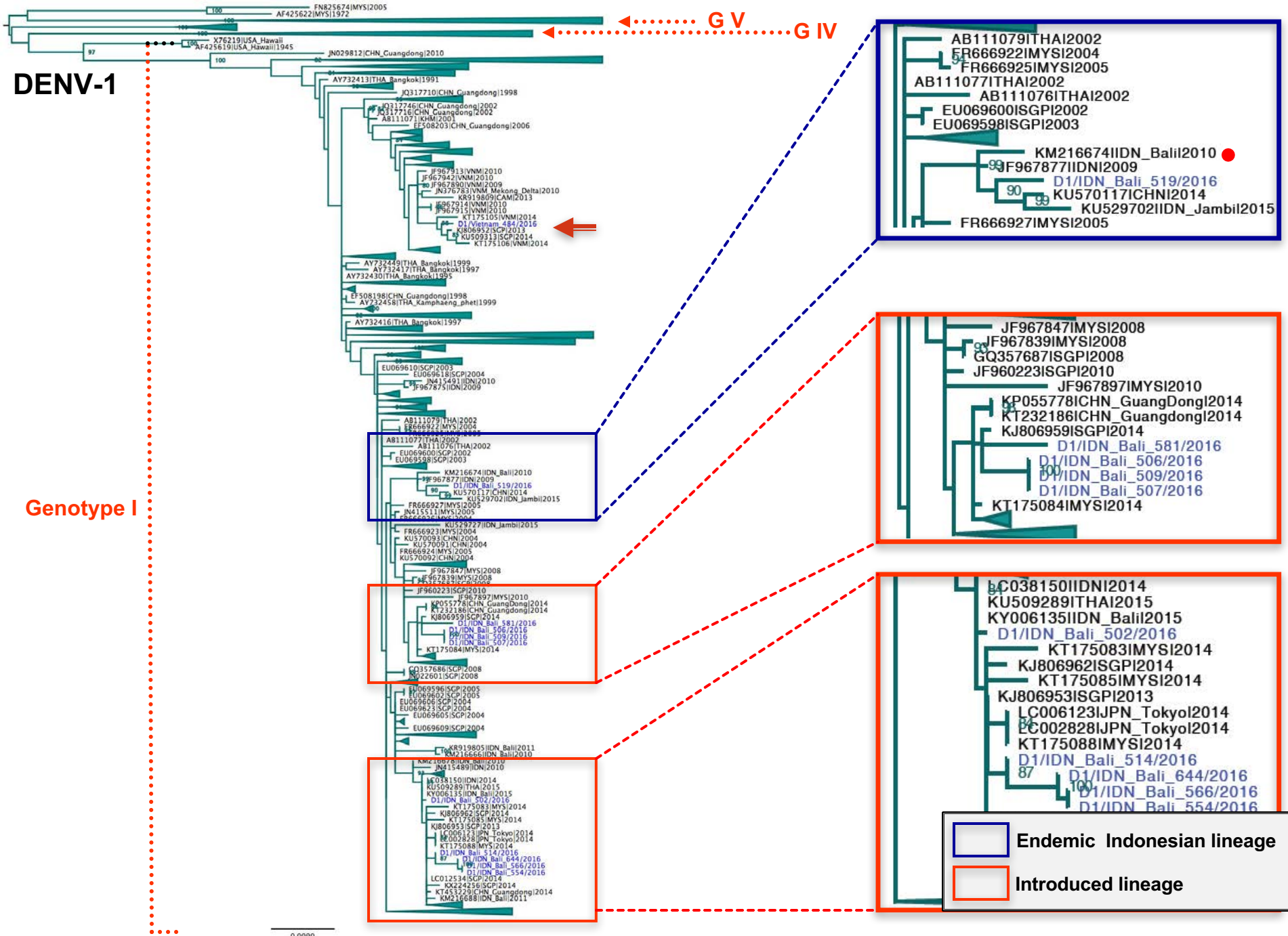


**To determine DENV circulating in the Asia Pacific region  
To monitor transmission dynamics and distribution of DENV serotypes, genotypes and lineages**

## METHODS



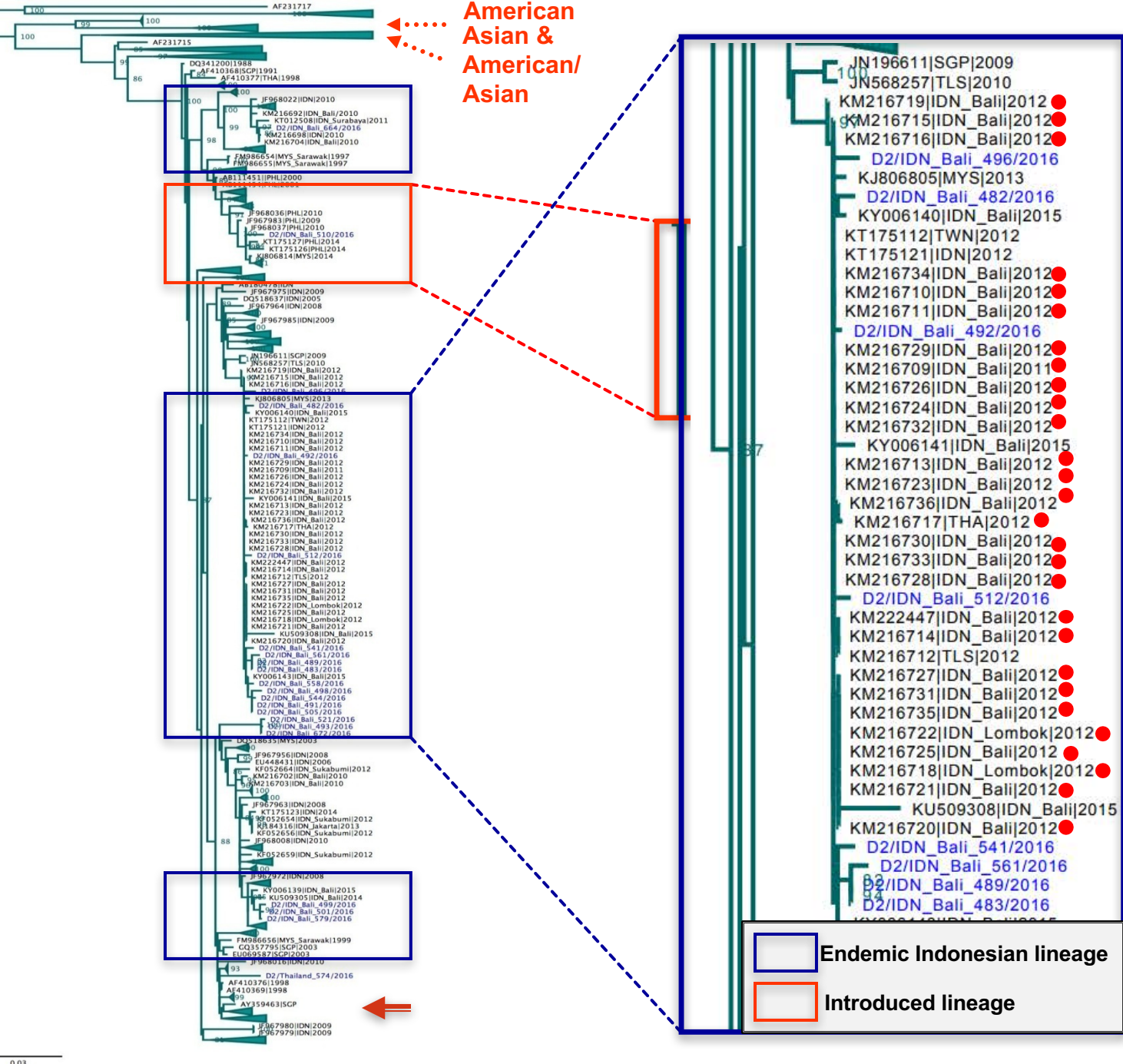
## Genotype I



**DENV-1 - Phylogenetic tree of 12 (2016) sequences from travellers to WA and 2070 comparison sequences**



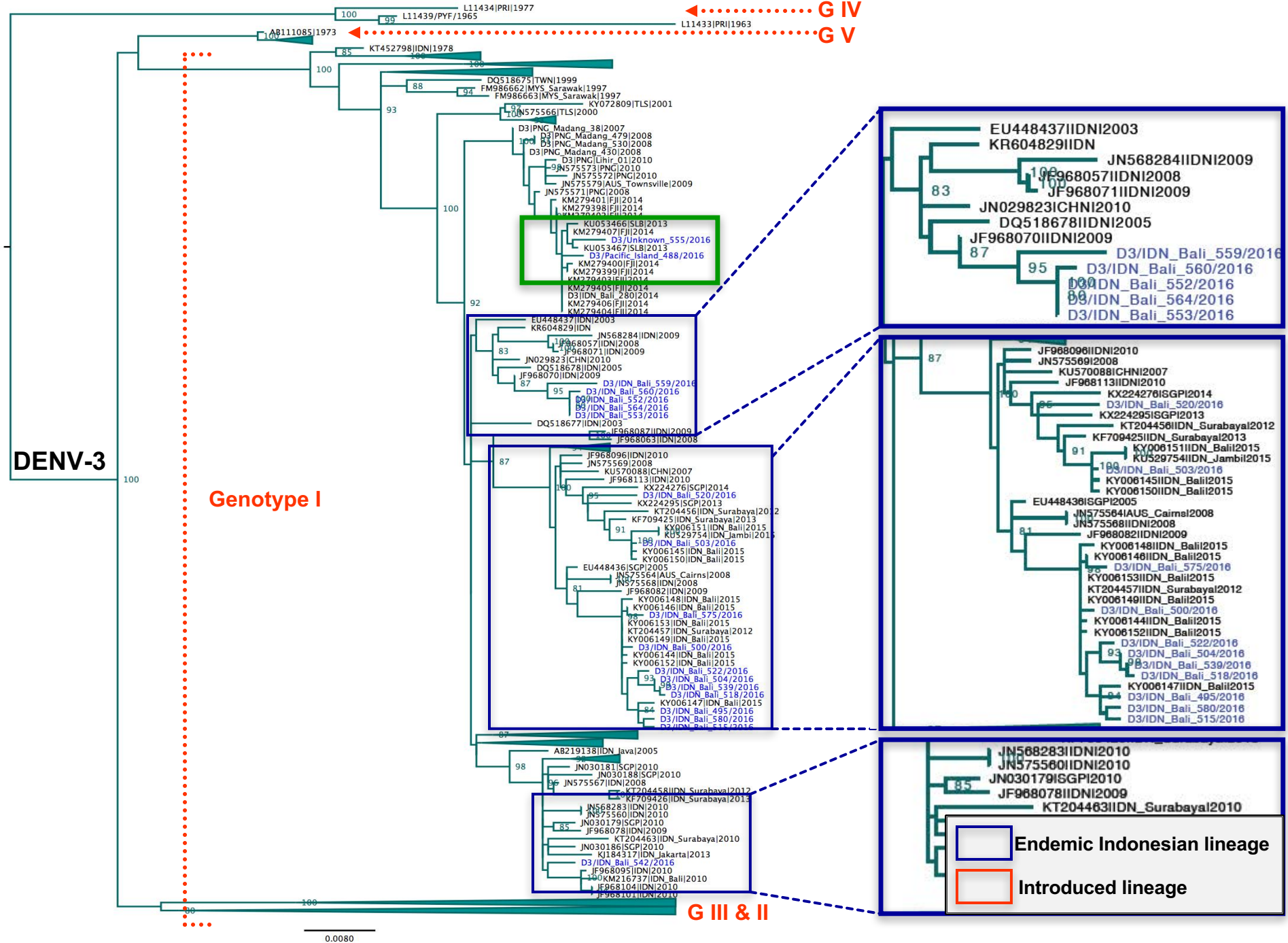
## Cosmopolitan



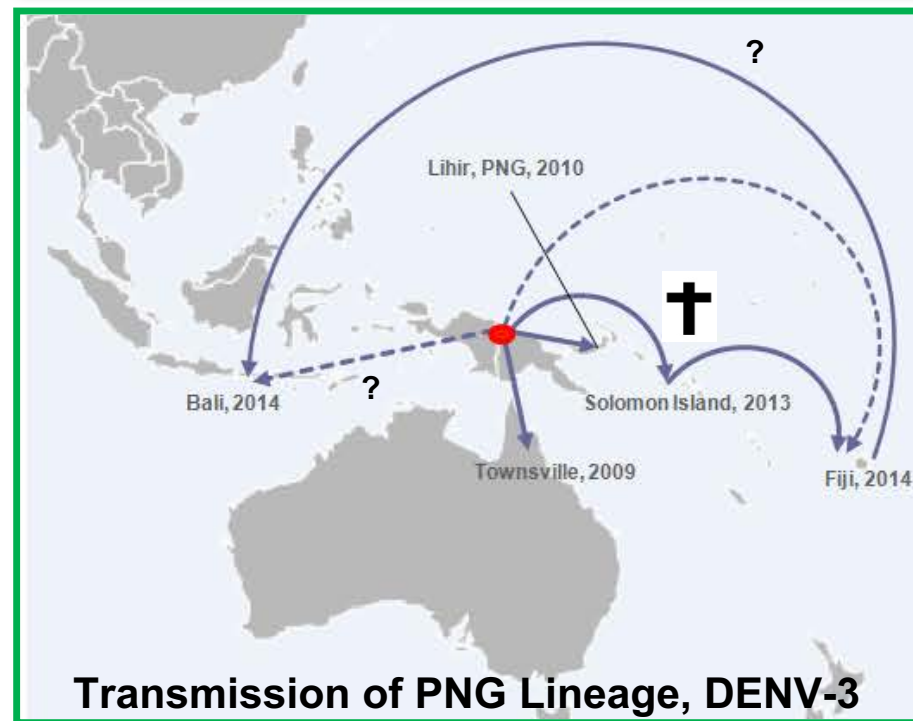
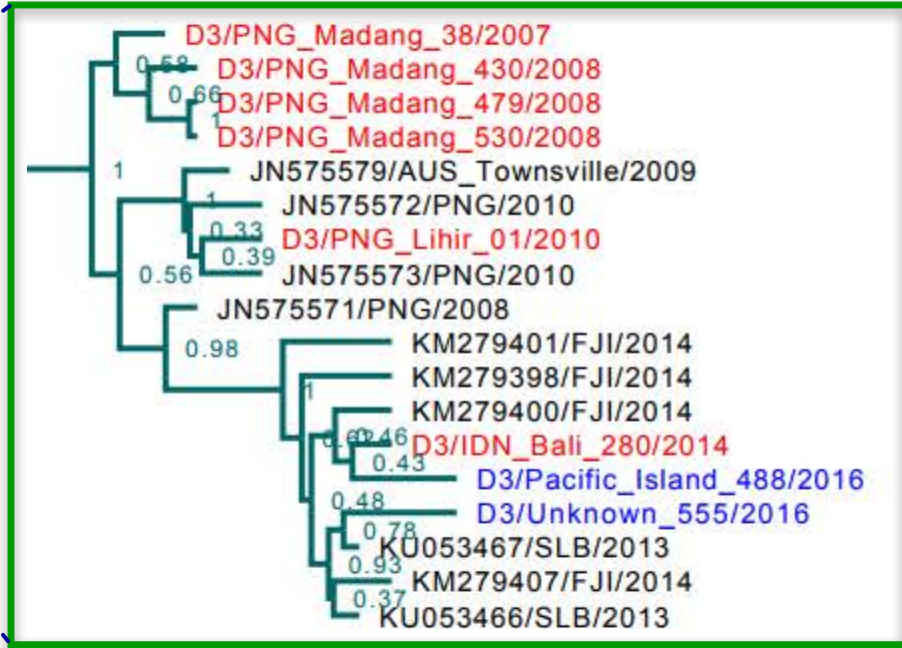
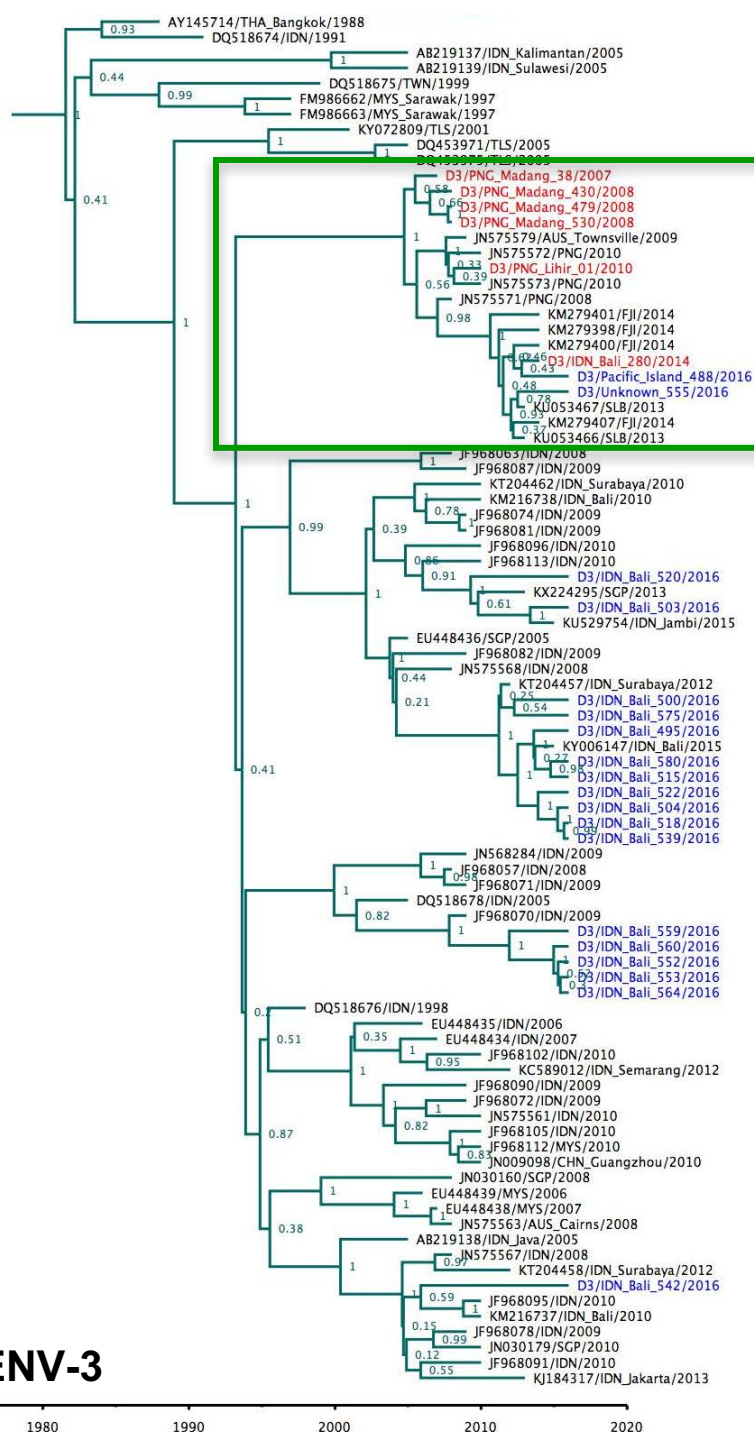
### DENV-2 - Phylogenetic tree of 23 (2016) sequences from travellers to WA and 1881 comparison sequences







**DENV-3 - Phylogenetic tree of 19 (2016) sequences from travellers to WA and 958 comparison sequences**



DENV-3

Transmission of PNG Lineage, DENV-3



# Conclusions



**Molecular epidemiological surveillance using WA travellers as sentinels provides important data on dynamic circulation of DENV in Asia-Pacific region.**

**All four DENV serotypes were identified circulating in Bali in 2016 with co-circulation of multiple lineages (local and introduced) within DENV-1 and DENV-2.**

**DENV-2 Cosmopolitan Genotype Lineage 4 is persistently circulating in Bali since 2011, and has also been identified in Timor Leste, and in travellers returning to Germany and Taiwan**

**Although the PNG lineage caused no severe form of dengue in PNG, introduction into Solomon Islands in 2013 was associated with severe dengue with some deaths. This lineage is continuing to circulate in the Pacific and may cause other outbreaks in this region.**



## ACKNOWLEDGMENTS

- Suzi McCarthy ((School of Biomedical Sciences, UWA and ParthWest Laboratory)
- Timo Ernst (School of Biomedical Sciences, UWA)
- Kritu Panta (School of Biomedical Sciences, UWA)
- Alice Michie (School of Biomedical Sciences, UWA)
- Kara Imbrogno (School of Biomedical Sciences, UWA)



**Australian Government**

**Department of Foreign Affairs and Trade**

