

# Vector-Borne Diseases

Arbovirus and other vector-borne disease surveillance in NSW

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## NSW ANNUAL REPORT

2017

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# ACRONYMS AND ABBREVIATIONS

## **VBD**                      **Vector-borne diseases**

BFV	Barmah Forest virus	MAL	Malaria
CHIKV	Chikungunya virus	MVE	Murray Valley encephalitis
DENV	Dengue virus	RRV	Ross River virus
KUNV	Kunjin virus (a West Nile virus subtype)	ZIKV	Zika virus

## **LHD**                      **Local health district**

CC	Central Coast LHD	NS	Northern Sydney LHD
FW	Far West LHD	SES	South Eastern Sydney LHD
HNE	Hunter New England LHD	SNSW	Southern NSW LHD
IS	Illawarra Shoalhaven LHD	SWS	South Western Sydney LHD
M	Murrumbidgee LHD	SYD	Sydney LHD
MNC	Mid-North Coast LHD	WNSW	Western NSW LHD
NBM	Nepean Blue Mountains LHD	WS	Western Sydney LHD
NNSW	Northern NSW LHD	NSW	New South Wales

## **SA2**                      Statistical Area Level 2 <sup>1</sup>

<sup>1</sup> The SA2 is the lowest level of the geographical boundary structure for which Australian Bureau of Statistics (ABS) estimated resident population (ERP) data are generally available. For more information see the [ABS SA2 description](#).

# SUMMARY – VECTOR-BORNE DISEASES IN NSW

This report summarises NSW vector-borne disease (VBD)<sup>2</sup> surveillance data for notifiable arboviruses (arthropod-borne viruses) and other notifiable arthropod-borne diseases for 2017. The report notes changes in notifications over time and describes likely areas of disease acquisition for both local and exotic infections. NSW Health undertakes VBD surveillance to monitor VBD trends with the aim of implementing control measures to prevent further illness within the community from endemic local VBDs (such as Ross River virus and Barmah Forest virus), and to inform appropriate prevention messages for travellers to areas of the world with exotic vector-borne diseases (such as Dengue, Chikungunya, Zika and Malaria).

## Notified incidence of local and exotic vector-borne diseases in NSW, 2017\*

	2017		5 Year Mean		% change from 2016 <sup>#</sup>
	Count	Rate*	Count	Rate*	
Barmah Forest virus	123	1.6	174.2	2.3	232%
Chikungunya	47	0.6	22.8	0.3	21%
Dengue	313	4.0	295.6	3.9	-34%
Malaria	67	0.9	58	0.8	18%
Ross River virus	1,551	19.7	570.2	7.6	142%
Zika	5	0.1	7.4	0.1	-84%

\* Cases per 100,000 population, NSW (see Methods for population calculations).

# Percentage change in condition case count in 2017 relative to the 2016 case count.

There were no cases of human infection with Japanese Encephalitis virus, Yellow Fever virus, Kunjin virus, Murray Valley Encephalitis virus, Sindbis virus, 'Flavivirus – unspecified' or other arboviruses reported in 2017. There were also no reports of epidemic typhus.

## Key trends in 2017

- **Ross River virus** – dramatically increased notifications, escalating from the increased notifications seen in December 2016; largest RRV outbreak of recent years, predominantly affecting southern inland areas of the state
- **Chikungunya virus** – continued the upward trend in notifications; predominantly Bangladesh and India travel
- **Dengue virus** – decreased notifications; India most common source country; DENV-2 most common serotype
- **Barmah Forest virus** – increased notifications but continued low activity overall
- **Malaria** – increased notifications; India the most common source country but increased reporting of acquisition in countries in Africa, particularly associated with *P.falciparum* infections
- **Zika virus** – markedly decreased notifications, coinciding with resolving ZIKV outbreaks overseas.

## Mosquito and sentinel chicken surveillance for vector-borne arboviruses

In NSW, the presence of arboviruses in the environment is achieved through surveillance of chicken flocks, trapping of mosquitoes for virus isolation, and by human case surveillance.

The emphasis of the chicken surveillance is on detecting the presence of flaviviruses (Murray Valley Encephalitis and Kunjin viruses) across northern, inland areas of NSW. Regularly during the arboviral season (November – April/May) chickens in the flocks are bled, and the samples are tested for antibodies to these flaviviruses.

For further information see the arbovirus and vector monitoring surveillance reports at:

[www.health.nsw.gov.au/environment/pests/vector/Pages/surveillance.aspx](http://www.health.nsw.gov.au/environment/pests/vector/Pages/surveillance.aspx)

<sup>2</sup> In this report arbovirus and other notifiable arthropod-borne infections are collectively referred to as vector-borne diseases.

# BARMAH FOREST VIRUS

Barmah Forest virus (BFV) infection is a vector-borne disease which is endemic in many parts of NSW. Infection rates are generally highest in the summer and autumn months. Cases are usually only followed up if they are believed to have been acquired in a non-endemic area.

The major mosquito vector in inland areas is *Culex annulirostris* which breeds in freshwater habitats. BFV transmission in coastal areas is most commonly due to saltmarsh mosquitoes, including a number of *Aedes* species.

In 2017, notifications of BFV infections increased compared to the previous year but were below the historical average. Notifications were again highest along the north coast of NSW, particularly among residents of the Northern NSW Local Health District.

## Summary 2017

- Case count: 123
- Notification rate per 100,000: 1.6

## Overall trend:

- Notable increase in annual total compared to the previous year (43 cases)
- Notification rate still below the 5 year mean (2.3 per 100,000)

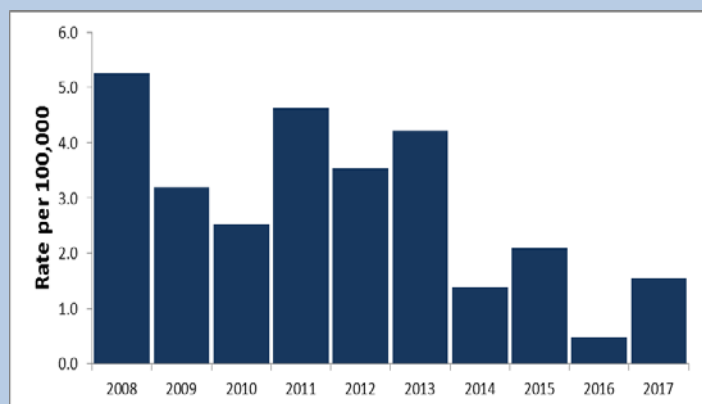
## Groups with highest notification rates in 2017

- Age: 50-59 years – 3.1 per 100,000 (25% of cases)
- Sex: Female – 1.7 per 100,000 (54% of cases)
- Local health district:  
Northern NSW – 18.3 per 100,000 (55% of cases)

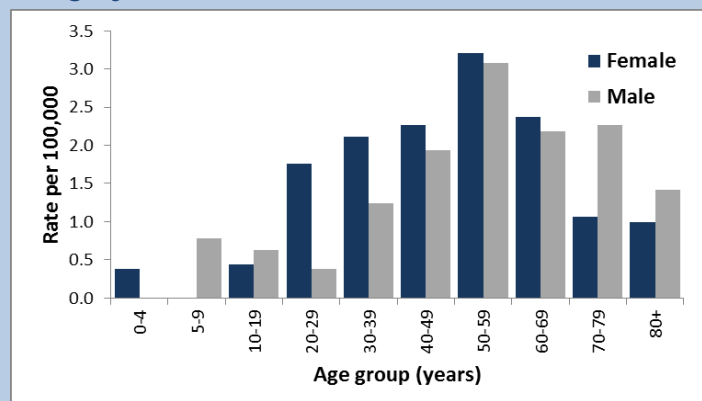
## Seasonality

- Notifications were highest in May (24 cases) and June (25 cases)

## Notification rate per 100,000 population by year, 2008 – 2017, NSW



## Notification rate per 100,000 population by age category and sex, 2017, NSW



## Number of cases and rates (per 100,000) by Local Health District, 2017, NSW

LHD	Count		Rate/100,000	
	2017	5yr mean	2017	5yr mean
CC	4	8.0	1.2	2.4
FW	0	1.4	0.0	4.5
HNE	13	42.2	1.4	4.7
IS	4	7.2	1.0	1.8
M	8	6.8	2.7	2.3
MNC	27	49.0	12.1	23.0
NBM	0	3.8	0.0	1.0
NNSW	56	93.2	18.3	31.7
NS	2	2.0	0.2	0.2
SES	2	1.0	0.2	0.1
SNSW	0	6.8	0.0	3.4
SWS	0	1.6	0.0	0.2
SYD	1	0.8	0.2	0.1
WNSW	6	7.2	2.1	2.6
WS	0	1.0	0.0	0.1
NSW	123	174.2	1.6	2.3

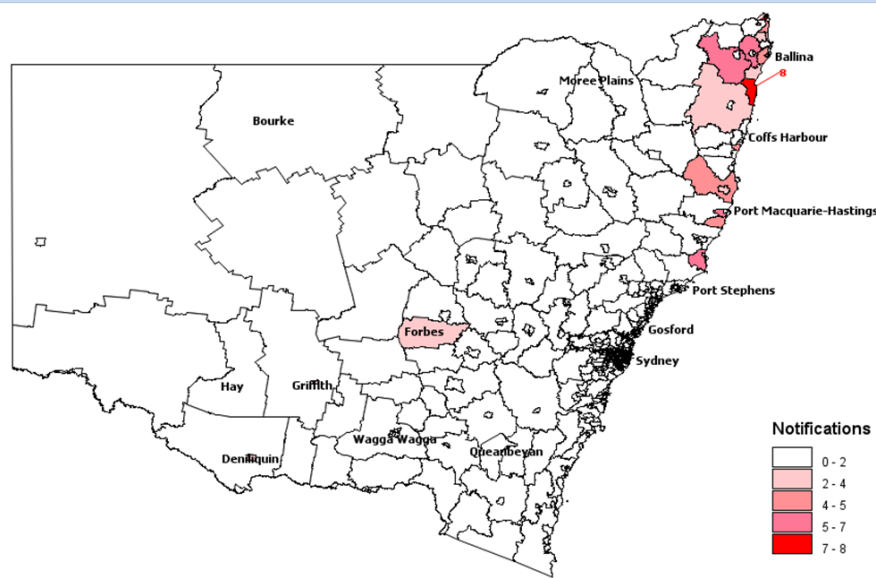
## Barmah Forest virus – continued

### Place of acquisition

Place of residence is used as a surrogate for place of acquisition for BFV infection. The highest numbers of BFV notifications were again in the Northern NSW LHD, particularly the Maclean/Yamba/Iluka and Tweeds Head - South regions, but also in regions along the NSW Mid-North Coast.

### Barmah Forest virus notifications by Statistical Area-2 (SA2) district, 2017, NSW.

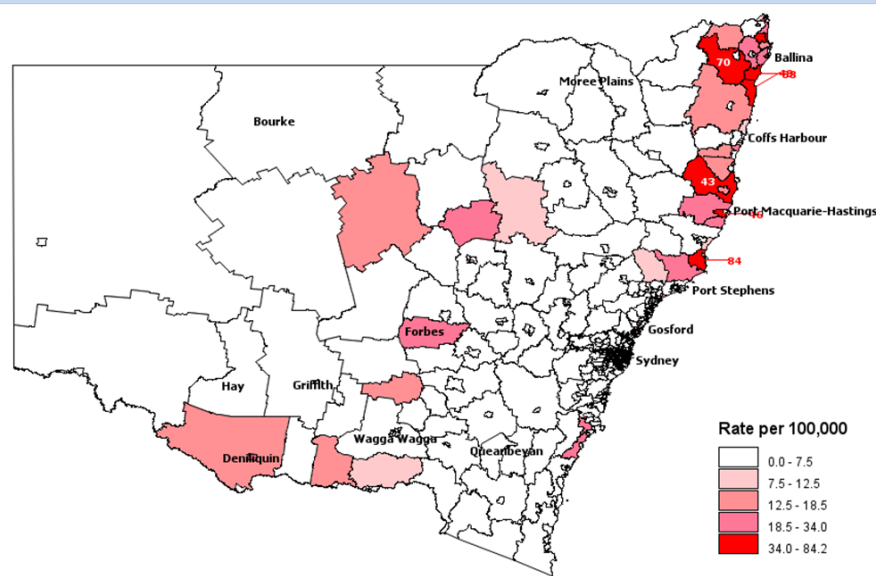
#### BFV notifications by Statistical Area-2 (SA2) district, 2017, NSW



#### Number of cases and rates (per 100,000) by Statistical Area-2 (SA2), 2017, NSW \*

Region (SA2)	Count	Rate/100,000
Maclean - Yamba - Iluka	8	48.6
Tweed Heads - South	7	25.2
Forster-Tuncurry Region	5	84.2
Wauchope	5	45.9
Casino Region	5	70.5
Lismore Region	5	32.4
Ballina Region	4	24.3
Pottsville	4	30.2
Sawtell - Boambee	4	20.1
Ballina	4	23.4
Laurieton - Bonny Hills	4	24.7
Kempsey Region	4	42.9
Brunswick Heads - Ocean Shores	3	35.2
Mullumbimby	3	39.6
Evans Head	3	58.3

#### BFV notification rates per 100,000 population by Statistical Area-2 (SA2) district, 2017, NSW



\* Data presented for regions with more than two BFV notifications in 2017.

# CHIKUNGUNYA VIRUS

Chikungunya virus (CHIKV) is an alphavirus, the same genus as Ross River virus, Barmah Forest virus and Sindbis virus. CHIKV infections occur in many parts of Africa and Asia, including many areas where dengue is also common.

CHIKV is transmitted by the bite of an infected *Aedes* spp. mosquito, predominantly *Ae. aegypti* and *Ae. albopictus*. While there have been no reports of chikungunya virus acquired in Australia, transmission remains a risk in parts of north Queensland where transmission-competent mosquitoes circulate.

## Summary 2017

- Case count: 47
- Notification rate per 100,000: 0.6
- Major source country: Bangladesh (55%)

## Overall trend:

- The increase in annual notifications compared to 2016 (39 cases) continues the upward trend since 2013.
- South Asia continues to be major region of infection risk; Bangladesh overtook India as the major source of infections in 2017.

## Groups with highest notification rates in 2017

- Age: 30-39 years – 1.2 per 100,000 (30% of cases)
- Sex: Male – 0.6 per 100,000 (53% of cases)
- Local health district:  
Western Sydney– 1.2 per 100,000 (26% of cases)

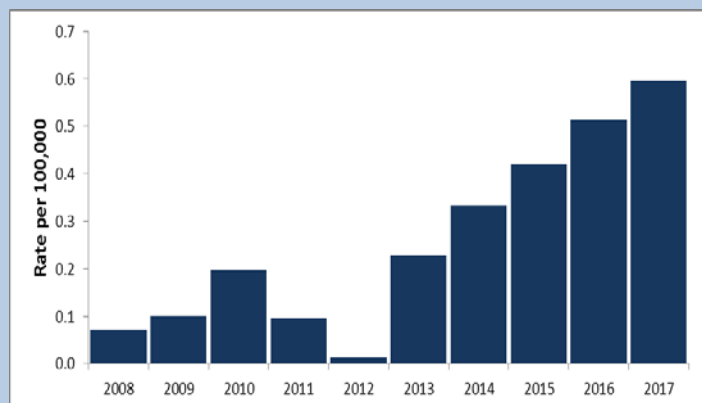
## Seasonality

- Most commonly reported during the Australian winter, particularly August (12 cases)

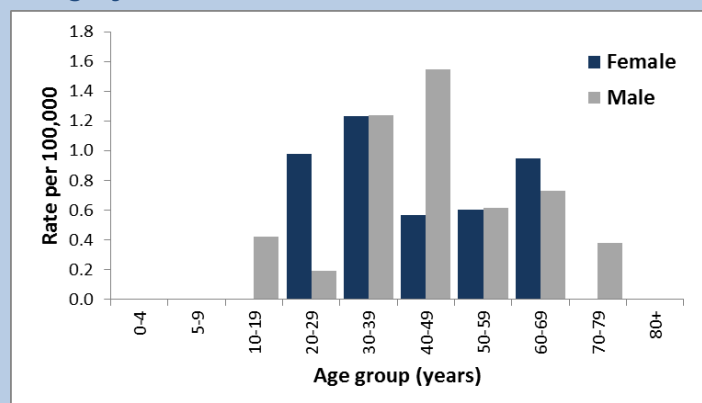
## Place of acquisition in 2017

- Bangladesh (55%), India (28%)

## Notification rate per 100,000 population, by year, 2008 – 2017, NSW



## Notification rate per 100,000 population by age category and sex from 2017, NSW



## Number of cases and rate (per 100,000) by Local Health District, 2017, NSW

LHD	Count		Rate	
	2017	5yr mean	2017	5yr mean
CC	2	0.6	0.6	0.2
FW	0	0.0	0.0	0.0
HNE	1	1.2	0.1	0.1
IS	0	1.8	0.0	0.5
M	0	0.0	0.0	0.0
MNC	1	0.4	0.4	0.2
NBM	1	1.0	0.3	0.3
NNSW	0	0.8	0.0	0.3
NS	6	2.4	0.7	0.3
SES	6	4.4	0.6	0.5
SNSW	0	1.0	0.0	0.5
SWS	9	2.4	0.9	0.3
SYD	9	3.0	1.4	0.5
WNSW	0	0.4	0.0	0.1
WS	12	6.2	1.2	0.7
NSW	47	22.8	0.6	0.3



## Chikungunya – continued

### Place of acquisition

Bangladesh was the most common source of chikungunya infection amongst notified cases in 2017, with 26 cases (55%) notified, replacing India which, nevertheless, reported 13 cases in 2017. All but one of the CHIKV cases were in residents of metropolitan Sydney.

There were no locally-acquired cases of chikungunya in 2017.

### Number of cases of chikungunya by country of acquisition, 2017, NSW.

Country of acquisition	Total	% Total
Bangladesh	26	55%
Cambodia	1	2%
Colombia	1	2%
India	13	28%
Indonesia	5	11%
Philippines	1	2%
Total	47	

# DENGUE VIRUS

Dengue virus (DENV) is a flavivirus. Four serotypes of dengue viruses have been described - dengue 1, 2, 3 and 4. Each of the 4 serotypes is capable of causing the full spectrum of clinical manifestations following DENV infection. Humans and non-human primates are reservoirs for the virus and maintain it in limited forest settings of Asia, Africa, and the Americas. Periodic dengue outbreaks in Pacific Islands and Territories also put NSW travellers at risk.

Transmission is via the bite of an infective female mosquito, principally *Aedes aegypti*. This is a highly domesticated urban mosquito found in countries of the tropics and subtropics. In Australia, this mosquito is currently confined to parts of northern Queensland. *Ae. aegypti* is a day-biting species, with increased biting activity in the few hours after sunrise and before sunset. Humans are the preferred source of blood. *Ae. albopictus* can also transmit DENV.

## Summary 2017

- Case count: 313
- Notification rate per 100,000: 4.0
- Most common country acquired: India

## Overall trend:

- 34% decrease in notifications compared to 2016; similar notification rate to the 5 year mean
- DENV-2 remained most common serotype: 72% where serotype information available

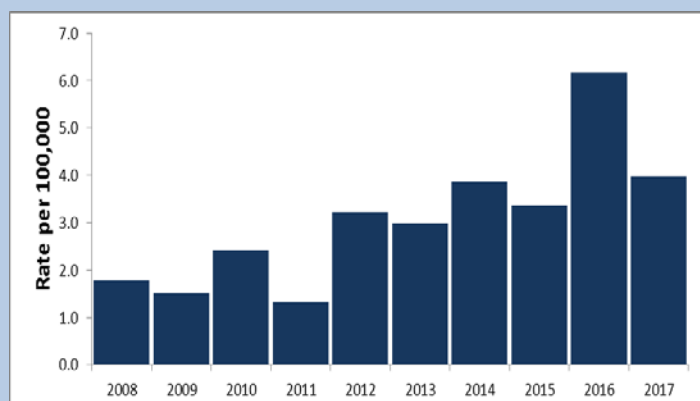
## Groups with highest notification rates in 2017

- Age: 30-39 years– 6.4 per 100,000 (23% of cases)
- Sex: Male – 4.3 per 100,000 (54% of cases)
- Local health district:  
Northern NSW – 6.2 per 100,000 (6% of cases)  
Western Sydney – 6.0 per 100,000 (19% of cases)

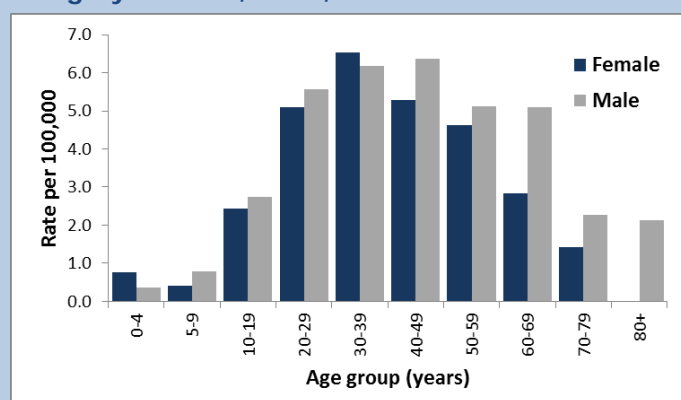
## Place of acquisition in 2017

- India – 18% of cases
- Indonesia – 16% of cases
- Thailand – 11% of cases

## Notification rate per 100,000 population by year, 2008 – 2017, NSW



## Notification rate per 100,000 population by age category and sex, 2017, NSW



## Number of cases and rates (per 100,000) by Local Health District, 2017, NSW

LHD	Count		Rate	
	2017	5yr mean	2017	5yr mean
CC	16	22.0	4.6	6.6
FW	0	0.0	0.0	0.0
HNE	18	31.0	1.9	3.4
IS	15	23.2	3.7	5.9
M	7	5.6	2.4	1.9
MNC	7	8.2	3.1	3.9
NBM	8	8.8	2.1	2.4
NNSW	19	32.0	6.2	10.9
NS	48	55.0	5.2	6.2
SES	51	70.4	5.5	8.0
SNSW	8	6.8	3.7	3.4
SWS	27	18.8	2.7	2.0
SYD	22	26.2	3.4	4.3
WNSW	4	4.6	1.4	1.7
WS	58	41.2	6.0	4.5
NSW	313	295.6	4.0	3.9

## Dengue virus – continued

### Place of acquisition

India replaced Indonesia as the most common source country for dengue infection in 2017, accounting for 17.9% of all cases. This coincided with reports from India of a widespread increase in dengue incidence.

Travel to Indonesia was associated with the second highest number of dengue cases (50 cases), this represented a dramatic reduction from the 266 cases believed to have been acquired in Indonesia in 2016. There were no locally-acquired cases of DENV in 2017, and no cases imported from other parts of Australia.

### Dengue serotypes

Dengue serotype information was available for 15% of cases notified. Of these, dengue serotype 2 (DENV-2) remained the most common serotype reported, accounting for 10.8% of cases overall, and 72% of the cases where serotype was available.

### Number of cases of DENV infection by country of acquisition and serotype (DENV 1-4), 2017, NSW.

County of acquisition	Dengue serotype					Total	% Total
	DENV-1	DENV-2	DENV-3	DENV-4	UNK#		
Bangladesh	0	0	0	0	6	6	1.9%
Cambodia	0	0	0	0	2	2	0.6%
Ethiopia	0	0	1	0	0	1	0.3%
Fiji	0	4	0	0	18	22	7.0%
India	2	2	1	0	51	56	17.9%
Indonesia	1	2	0	4	43	50	16.0%
Malaysia	0	1	0	0	10	11	3.5%
Maldives	0	0	0	0	1	1	0.3%
Myanmar	0	0	0	0	1	1	0.3%
Nepal	0	0	0	0	2	2	0.6%
New Caledonia	0	0	0	0	3	3	1.0%
Nigeria	0	0	0	0	1	1	0.3%
Papua New Guinea	0	0	0	0	2	2	0.6%
Philippines	0	0	0	0	8	8	2.6%
Samoa	0	3	0	0	18	21	6.7%
Sierra Leone	0	0	0	0	1	1	0.3%
Singapore	0	0	0	0	1	1	0.3%
Solomon Islands	0	3	0	0	5	8	2.6%
South-East Asia - NEC*	0	0	0	0	3	3	1.0%
Sri Lanka	0	5	0	0	21	26	8.3%
Thailand	0	4	0	0	31	35	11.2%
Timor-Leste	1	0	0	1	2	4	1.3%
Uganda	0	0	0	0	1	1	0.3%
Vanuatu	1	10	0	0	22	33	10.5%
Vietnam	0	0	1	0	10	11	3.5%
Unknown	0	0	0	0	3	3	1.0%
Total (% of all cases)	5 (1.6%)	34 (10.8%)	3 (1.0%)	5 (1.6%)	266 (85.0%)	313	

# UNK – unknown

\* NEC – not elsewhere coded

# MALARIA

Malaria is an infection of the liver and red blood cells caused by microscopic protozoan parasites of the *Plasmodium* type. There are five species of parasites that cause malaria: *P. falciparum*, *P. ovale*, *P. malariae*, *P. vivax* and, rarely, *P. knowlesi*. Malaria due to *P. falciparum* is associated with more severe symptoms and most fatal cases.

Malaria parasites are spread through the bite of infective *Anopheles* mosquitoes. There are no competent vectors of malaria known to occur in NSW. Effective chemoprophylaxis is available for travellers to protect against malaria.

Mainland Australia is free of malaria but it is occasionally detected in the Torres Strait. Travellers are at risk of contracting malaria when travelling without appropriate protection in malaria-endemic parts of tropical and subtropical areas of Asia, Africa, Central and South America, the Pacific Islands and parts of the Middle East.

## Summary 2017

- Case count: 67
- Notification rate per 100,000: 0.9

## Overall trend:

- 18% increase in notifications compared to 2016, but a similar notification rate to the 5 year mean

## Malaria species

- 49% *P. falciparum*, 38% *P. vivax*, where species known

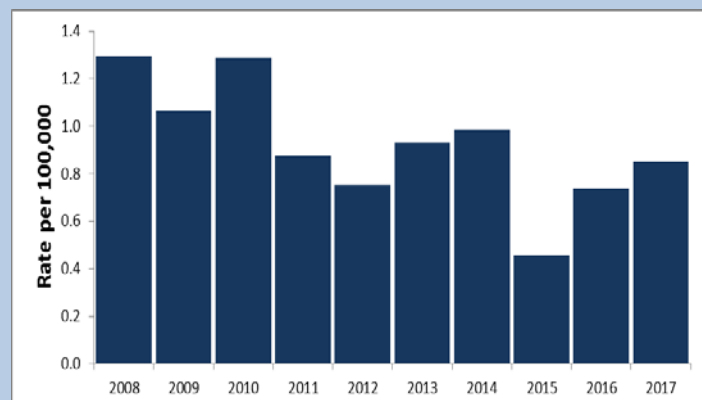
## Groups with highest notification rates in 2017

- Age: 20-29 years – 1.6 per 100,000 (24% of cases)  
30-39 years – 1.1 per 100,000 (19% of cases)
- Sex: Male – 1.2 per 100,000 (72% of cases)
- Local health district:  
Far Western NSW – 3.3 per 100,000 (1% of cases)  
Western Sydney – 3.1 per 100,000 (33% of cases)

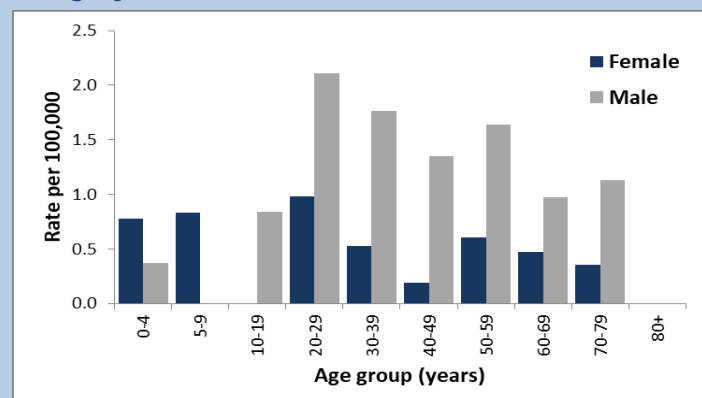
## Place of acquisition in 2017

- India (18% of cases), Sierra Leone (15% of cases)
- *P. falciparum* – 93% acquired in African countries

## Notification rate per 100,000 population by year, 2008 – 2017, NSW



## Notification rate per 100,000 population by age group and sex, 2017, NSW



## Number of cases and rates (per 100,000) by Local Health District, 2017, NSW

LHD	Count		Rate	
	2017	5yr mean	2017	5yr mean
CC	0	0.8	0.0	0.3
FW	1	0.2	3.3	0.0
HNE	1	5.6	0.1	0.6
IS	2	5.0	0.5	1.3
M	1	2.6	0.3	0.4
MNC	3	3.0	1.3	1.5
NBM	3	2.8	0.8	1.3
NNSW	4	2.2	1.3	0.2
NS	3	3.2	0.3	0.9
SES	4	6.4	0.4	0.7
SNSW	0	1.8	0.0	0.2
SWS	7	3.8	0.7	12.3
SYD	6	9.0	0.9	2.7
WNSW	1	1.8	0.4	0.7
WS	30	20.4	3.1	7.0
NSW	67	58	0.9	0.8

## Malaria – continued

### Place of acquisition

India was the most common source country for malaria cases notified in 2017, accounting for 17.9% of cases, followed by Sierra Leone (14.9%). Countries in Africa accounted for 41 cases (61.2%).

There were no locally-acquired cases of malaria in 2017.

### Malaria species

*P. falciparum* was the most common species identified, accounting for 30 (49%) of the 61 cases where species information was available, followed by *P. vivax* (38%). All but two of the 30 *P. falciparum* cases were acquired in countries in Africa while most of the *P. vivax* cases were associated with travel to India, Pakistan or Papua New Guinea.

### Number of cases of malaria by country of acquisition and species, 2017, NSW.

County of acquisition	Malaria species					Total	% Total
	<i>P. falciparum</i>	<i>P. malariae</i>	<i>P. ovale</i>	<i>P. vivax</i>	UK <sup>#</sup>		
Afghanistan	0	0	0	1	0	1	1.5%
Botswana	0	0	1	0	0	1	1.5%
DR of the Congo	1	0	0	0	0	1	1.5%
Ghana	4	0	0	0	1	5	7.5%
Guinea	0	0	2	0	0	2	3.0%
India	0	1	0	11	0	12	17.9%
Indonesia	2	0	0	1	0	3	4.5%
Kenya	1	0	0	0	0	1	1.5%
Liberia	1	0	0	0	0	1	1.5%
Nigeria	1	0	2	0	2	5	7.5%
Pakistan	0	0	0	5	0	5	7.5%
Papua New Guinea	0	0	0	4	0	4	6.0%
Sierra Leone	9	0	0	0	1	10	14.9%
South Africa	1	0	0	0	0	1	1.5%
South America – NEC*	0	0	0	1	0	1	1.5%
South Sudan	2	0	1	0	0	3	4.5%
Southern & East Africa – NEC*	1	0	0	0	0	1	1.5%
Sudan	3	0	0	0	0	3	4.5%
Uganda	2	1	0	0	2	5	7.5%
Zambia	1	0	0	0	0	1	1.5%
Zimbabwe	1	0	0	0	0	1	1.5%
Total (% of all cases)	30 (44.8%)	2 (3.0%)	6 (9.0%)	23 (34.3%)	6 (9.0%)	67	

# UK – unknown

\* NEC – not elsewhere coded. Multiple possible exposure countries reported.

# ROSS RIVER VIRUS

Ross River virus (BFV) infection is a vector-borne disease which is endemic in many parts of NSW. Infection rates are generally highest in the summer and autumn months. Cases are usually only followed up if they are believed to have been acquired in a non-endemic area.

As with BFV infection, the major mosquito vector for RRV in inland areas is *Culex annulirostris* which breeds in freshwater habitats. RRV transmission in coastal areas is most commonly due to saltmarsh mosquitoes, including a number of *Aedes* species. Some marsupials are a natural reservoir for RRV and are likely to be important in the circulation of RRV that includes sporadic transmission to humans.

While the incidence of RRV in the previous year (2016) was low overall, there was a dramatic rise in RRV notifications in December 2016 in the western and south-western parts of the state following heavy spring rain and flooding.

## Summary 2017

- Case count: 1,551
- Notification rate per 100,000: 19.7

## Overall trend:

- 2.4 times increase in notifications compared to 2016 (641 cases), and a similar increase in notification rate compared to the 5 year mean.
- The 2016-2017 arbovirus season saw the largest RRV outbreak for many years

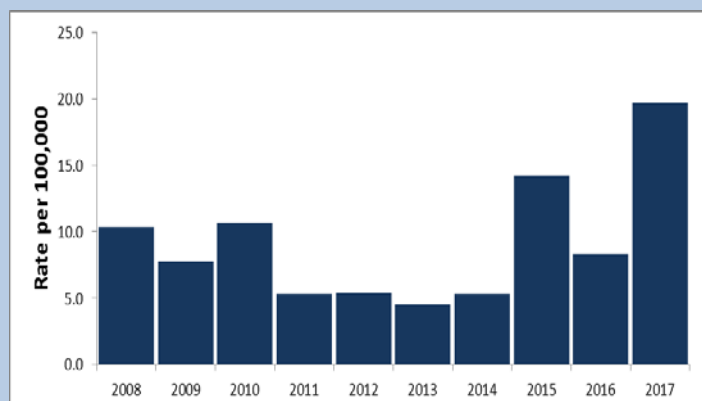
## Groups with highest notification rates in 2017

- Age: 50-59 years – 37.1% per 100,000 (24% of cases)
- Sex: Female – 19.8 per 100,000 (51% of cases)
- Local health district:  
Murrumbidgee – 133.0 per 100,000 (25.3% of cases)  
Far West – 117.6 per 100,000 (2.3% of cases)

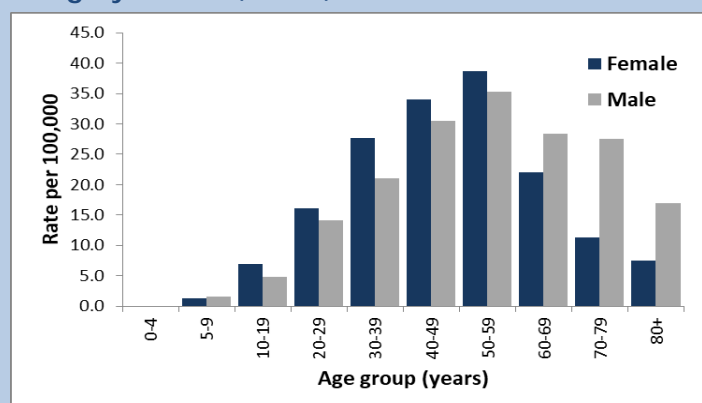
## Seasonality

- Notifications peaked in January, unlike the autumn peak seen in most seasons.

## Notification rate per 100,000 population by year, 2008 – 2017, NSW



## Notification rate per 100,000 population by age category and sex, 2017, NSW



## Number of cases and rates (per 100,000) by Local Health District (LHD), 2017, NSW

LHD	Count		Rate	
	2017	5yr mean	2017	5yr mean
CC	71	32.4	20.6	11.0
FW	36	16.6	117.6	1.8
HNE	360	196.6	38.7	22.1
IS	43	14	10.5	3.5
M	392	100.4	133.0	16.4
MNC	80	98.4	36.0	48.5
NBM	44	23.8	11.4	11.2
NNSW	148	168.6	48.3	19.1
NS	41	18.2	4.5	5.0
SES	26	13	2.8	1.4
SNSW	39	16.2	18.2	1.8
SWS	20	6.8	2.0	22.0
SYD	11	6.2	1.7	1.9
WNSW	201	77	71.9	27.8
WS	15	9.8	1.5	3.4
NSW	1,551	570.2	19.7	7.6

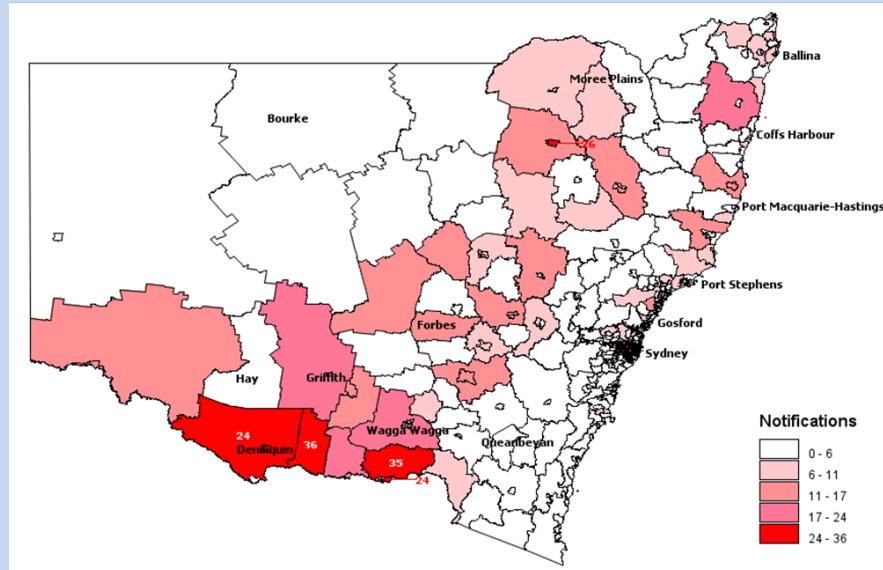
## Ross River virus – continued

### Place of acquisition

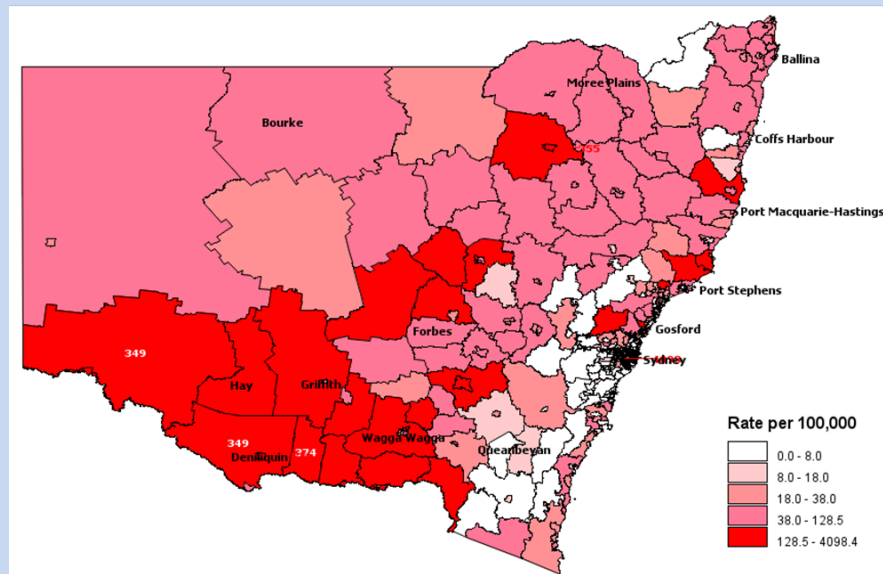
Place of residence is used as a surrogate for place of acquisition for Ross River virus infection. The highest numbers of RRV notifications and highest population incidence rates were for residents in the Murrumbidgee and Western NSW LHDs, particularly in the Tocomwal-Finley-Jerilderie, Albury, Deniliquin and Wagga Wagga regions, particularly in the first three months of the year.

RRV notifications increased again in the autumn months due to infections in NSW coastal regions, while RRV notifications decreased from most inland regions.

### RRV notifications by Statistical Area-2 (SA2) district, 2017, NSW



### RRV notification rates per 100,000 population by Statistical Area-2 (SA2) district, 2017, NSW



### Number of cases and rates (per 100,000) by Statistical Area-2 (SA2), 2017, NSW \*

Region (SA2)	Count	Rate/100,000
Tocomwal - Finley - Jerilderie	36	373.9
Albury Region	35	308.9
Narrabri	26	354.8
Deniliquin	24	324.3
Deniliquin Region	24	348.7
Albury - East	24	172.5
Griffith Region	23	174.4
Corowa Region	21	311.7
Wagga Wagga - East	20	118
Wagga Wagga Region	20	141.4
Grafton Region	19	124.3
Orange - North	19	102.4
Albury - South	18	162.2
Griffith (NSW)	17	89.2
Wentworth - Buronga	16	265.5
Narromine	15	215.6
Young	15	140.1
Albury - North	14	142
Tamworth Region	14	76.5
Morisset - Cooranbong	13	87.1
Kempsey Region	13	139.5
Wentworth-Balranald Region	13	348.8
Condobolin	13	180.6

\* Data presented for regions with more than 12 RRV notifications in 2017.

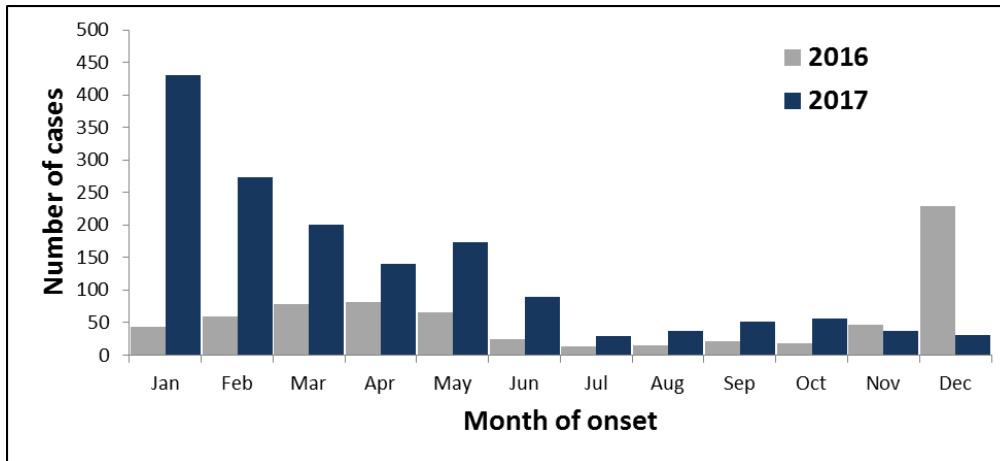
## Ross River virus – continued

### Month of acquisition

Notifications peaked in January following on from the unseasonably high numbers of notifications seen in December 2016. Residents of inland regions of NSW continued to be most affected in the first quarter of the year, in contrast to the 2014-15 outbreak when residents of NSW coastal areas were most affected.

Monthly totals of RRV notifications gradually decreased from February to April before a second smaller peak in notifications in May, predominantly related to notifications from coastal areas.

### Number of RRV cases by month of onset, 2017 compared to 2016, NSW.





# ZIKA VIRUS

Zika virus (ZIKV) is a flavivirus, closely related to dengue virus. It was first isolated in 1947 in Uganda's Zika forest. There are two distinct ZIKV lineages: the African lineage and the Asian lineage, the latter of which has emerged more recently in the Pacific and the Americas.

The first outbreak of ZIKV infection identified outside of Africa and Asia, occurred on Yap Island, FSM in 2007. In 2015, ZIKV emerged in South America with widespread outbreaks reported initially in Brazil and Columbia, with subsequent spread to many countries in South and Central America and the Caribbean.

Like dengue, transmission is principally via the bite of an infective *Aedes aegypti* mosquito. Maternal-fetal transmission of ZIKV has also been well documented with potentially serious consequences for the unborn child, including congenital abnormalities such as microcephaly. Sexual transmission of ZIKV is rare but well documented.

## Summary 2017

- Case count: 5
- Notification rate per 100,000: 0.1
- Congenital case: 0

## Groups with highest notification rate in 2017

- Age: 70-79 years – 0.2 per 100,000, (1 case)
- Sex: Female - 0.1 per 100,000 (60% of cases)
- Local health district  
Central Coast – 0.8 per 100,000 (60% of cases)

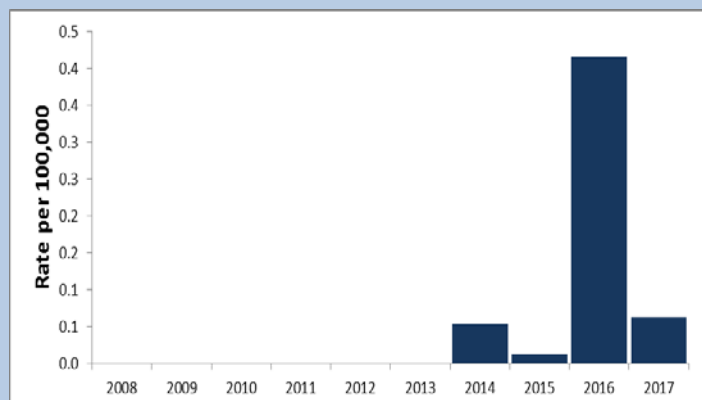
## Overall trend:

- A dramatic decrease in notifications compared to the previous year (32 cases), coinciding with resolving overseas outbreaks from the previous year

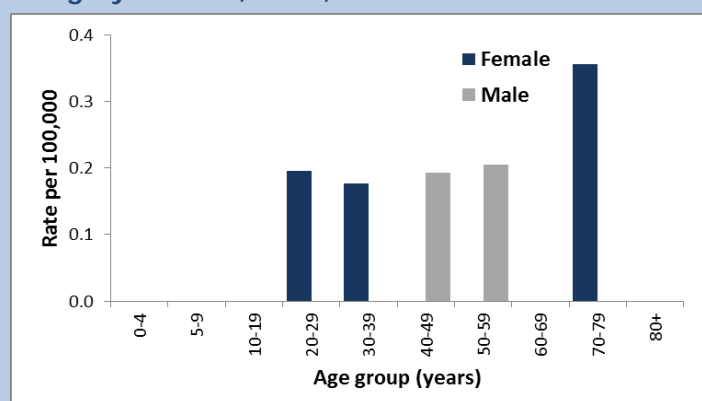
## Place of acquisition in 2017

- Colombia, Fiji, India, Philippines, Thailand (one case from each country)

## Notification rate per 100,000 population by year, 2008 – 2017, NSW



## Notification rate per 100,000 population by age category and sex, 2017, NSW



## Number of cases and rates (per 100,000) by Local Health District, 2017, NSW

LHD	Count		Rate	
	2017	5yr mean	2017	5yr mean
CC	3	0.2	0.9	0.0
FW	0	0.0	0.0	0.0
HNE	0	0.0	0.0	0.0
IS	0	1.0	0.0	0.3
M	0	0.6	0.0	0.2
MNC	0	0.2	0.0	0.0
NBM	1	0.2	0.3	0.1
NNSW	0	0.2	0.0	0.0
NS	0	1.6	0.0	0.8
SES	0	1.4	0.0	0.2
SNSW	0	0.0	0.0	0.0
SWS	0	0.4	0.0	0.0
SYD	0	1.0	0.0	0.3
WNSW	0	0.2	0.0	0.1
WS	1	0.4	0.1	0.1
NSW	5	7.4	0.1	0.1

## Zika virus – continued

### Place of acquisition

The most common countries associated with ZIKV infection were Colombia, Fiji, India, Philippines, Thailand (one case each). This contrasts with the major source countries for cases in 2016 - Brazil, Mexico and Tonga.

At the end of 2017, all five source countries for ZIKV cases identified in 2017 were classified as Category 2 areas under the WHO Zika area classification system, defined as areas “either with evidence of virus circulation before 2015 or area with ongoing transmission that is no longer in the new or re-introduction phase, but where there is no evidence of interruption” (see the [WHO Zika virus area classification table for 20 December 2017](#)).

There were no locally-acquired cases of ZIKV in 2017 and there were no cases imported from other parts of Australia.

# METHODS

The data in this report are derived from disease surveillance and outbreak investigation activities undertaken by staff from NSW public health units and Communicable Diseases Branch. The management of human vector-borne disease surveillance in NSW is the shared responsibility of NSW public health units, and both Communicable Diseases Branch and Environmental Health Branch<sup>3</sup> of Health Protection NSW.

## Notifiable vector-borne diseases in NSW

Under the Public Health Act 2010 (NSW), all arboviral infections are notifiable in NSW. Other notifiable vector-borne diseases are malaria and epidemic typhus. NSW laboratories report cases to NSW public health units. Notifiable disease data are routinely entered by public health unit staff into the NSW Notifiable Conditions Information Management System (NCIMS).<sup>4</sup>

## Data sources for this report

Data in this report has been extracted from NCIMS held by Health Protection NSW.

## Analysis

We analysed data for all notifiable vector-borne infections for NSW residents. In May 2018 the 2017 year data was extracted from NCIMS using Secure Analytics for Population Health Research and Intelligence (SAPHaRI) and based on the actual or calculated date of onset of disease. The count of notifications of each notifiable vector-borne disease for 2017 was calculated and this was then used to calculate crude annual incidence ('notification') rates for each disease based upon the NSW estimated resident population at 30 June 2017.<sup>5</sup> Mean annual notification counts and incidence rates for the five year period 2012-2016 were also calculated for comparison with the 2017 data.

Notification maps of BFV and RRV infection by ABS statistical area level 2 (SA2) of residence for 2017 are shown. Place of residence is used as a surrogate for place of acquisition for cases of these infections but the infection may have been acquired elsewhere.

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3. Environmental Health Branch auspices the NSW mosquito and sentinel chicken surveillance for vector-borne arboviruses which is coordinated by the Medical Entomology Department, CIDMLS, ICPMR, Pathology West. For surveillance reports see: [www.health.nsw.gov.au/environment/pests/vector/Pages/surveillance.aspx](http://www.health.nsw.gov.au/environment/pests/vector/Pages/surveillance.aspx).

4. NSW Health Notifiable Conditions Information Management System (NCIMS), Communicable Diseases Branch and Centre for Epidemiology and Evidence, NSW Ministry of Health

5. Notifications per 100,000 estimated resident population based on ABS 2006 and 2011 Census counts. Population projections by the Centre for Epidemiology and Evidence, NSW Ministry of Health, based on data from the NSW Department of Planning and Environment.

# ACKNOWLEDGEMENTS

The NSW Vector-Borne Diseases Annual Report 2017 was possible due to the collaborative work of many people who contribute in varying capacities to the management of communicable enteric diseases in NSW, including the following:

- NSW public health unit staff for surveillance, reporting and investigation of unusual disease cases and outbreaks
- Public and private laboratories, supported by the NSW Arbovirus Reference Laboratory, Clinical Virology, CIDMLS, ICPMR, Pathology West
- Communicable Diseases Branch, Health Protection NSW, NSW Health.
- Clinicians across NSW who assist in the diagnosis and follow up vector-borne diseases.