

A CLUSTER OF LOCALLY-ACQUIRED ROSS RIVER VIRUS INFECTION IN OUTER WESTERN SYDNEY

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This article reports on the investigation of a cluster of Ross River virus (RRV) infections in the outer western suburbs of metropolitan Sydney. Ross River virus is an arbovirus transmitted by mosquitoes, and its symptoms include arthralgia, myalgia, arthritis, fatigue, fever, and headache.¹ A rash, usually maculopapular and found on the trunk and limbs, accompanies these symptoms in 40–60 per cent of patients.² Duration and severity of symptoms can vary, with full recovery taking from several months to a number of years.³

Ross River virus is most often considered a disease of rural Australia.^{4,5} However, an outbreak of RRV infection identified among people living in the north-western outskirts of Sydney, and outbreaks in Brisbane, Perth and south-western Australia, reveal the potential for RRV activity to spread to metropolitan areas.^{6,7,8,9}

BACKGROUND

In early 1999, the Western Sector Public Health Unit (WSPHU) began receiving an increased number of notifications of RRV virus. Follow-up was conducted by the WSPHU, and a team from the Department of Medical Entomology at the Institute of Clinical Pathology and Medical Research (ICPMR) conducted an intense short-term mosquito trapping program in the Werrington area to identify possible local vectors associated with a cluster of RRV infection. The Werrington area is a residential area within the boundaries of the Wentworth Area Health Service, split by a creek and a park. At the south end are the large open grasslands of the University of Western Sydney (Nepean). At the northern end is a large natural woodlands and wildlife area with an abundant macropod population.

METHODS

Infectious Disease Team

For the purpose of this investigation a confirmed case of RRV infection was defined as being any person:

- residing in the Wentworth Health Area, comprising the local government areas of Penrith, Blue Mountains and Hawkesbury;
- notified between January 1 and May 31 1999 by a laboratory or doctor, with a clinical onset after 31 December 1998;

- with two blood tests, collected at least two weeks apart, demonstrating a four-fold or greater increase in IgG antibody titre to RRV.

On notification of the first result, WSPHU staff contacted the referring doctor to ascertain the cases' clinical presentation, possible onset date and a travel history (if known). An exposure period was considered to be in the range of 3–28 days before onset of symptoms. This wider range than the 3–21 day incubation period was used to help account for any inaccuracies in the recollection of the case's activities and mosquito exposures.¹⁰ The case was then contacted and a questionnaire administered to confirm symptoms, onset and travel history. Information was also recorded on where the disease may have been acquired. Both the case and referring doctor were advised of the need for convalescent phase sera to be collected at least two weeks after the initial serology.

Environmental Health Team

Adult mosquito trapping

Weekly mosquito collections were conducted over a three-week period from late March to mid-April 1999. Dry-ice baited light traps were set at 10 sampling sites within the Werrington area,¹¹ located in the Penrith Local Government Area. Trapping sites were located 3–5 km in a north-easterly direction from the Penrith train station in the approximate area from which the human infections were reported, or near local mosquito habitats.

Arbovirus isolation

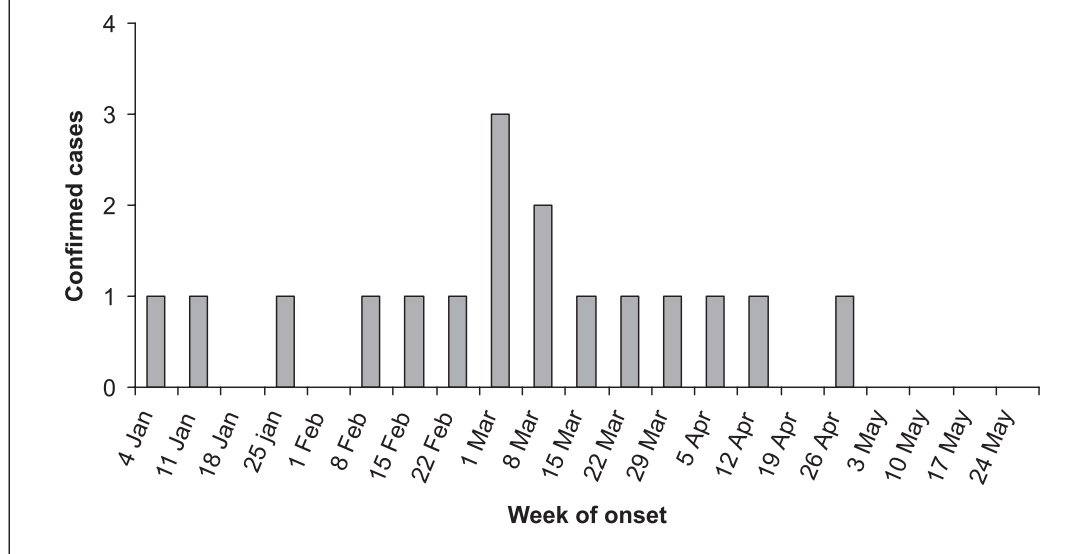
The mosquito collections were transported live to the Department of Medical Entomology at ICPMR, where they were identified and processed for virus isolation and identification of alpha- and flaviviruses.¹²

RESULTS

Infectious Disease Team

Between January and May 1999, 37 notifications for RRV virus were received by WSPHU. Twenty-six cases had repeat serology collected. Twenty-five cases were confirmed using the case definition. One case showed no rise in antibody titre after the repeat serology and wasn't classified as a confirmed case.

Histories were obtained for each confirmed case. Of the confirmed cases, 17 cases had not travelled beyond the boundaries of the Wentworth Area Health Service while eight cases had travelled to other areas. Of the 17 who had not travelled outside the area, 15 reported being bitten by mosquitoes in the exposure period prior to the onset of symptoms. Of those who had travelled out of the area, six reported contact with mosquitoes while two could not recall being bitten by mosquitoes.

FIGURE 7**SYMPTOM ONSET OF ROSS RIVER VIRUS, WERRINGTON NSW, JAN–MAY 1999.**

Results of the case histories identified three cases who lived in the Werrington area, and who recalled being bitten in the local area. A further case was identified as a man who worked in the Werrington area. The onset of symptoms rose during the early months of 1999 and peaked in March with numbers declining in the following months (Figure 7).

Environmental health team

Adult mosquito trapping

Seventeen species of mosquito were collected. *Aedes notoscriptus* and *Culex annulirostris* were the most common species, and both have been associated with RRV. *Culex annulirostris* is the major vector of RRV in inland NSW; *Aedes notoscriptus* is a competent laboratory vector, has been found naturally infected, and is suspected as a vector for urban areas. Other species recorded appeared infrequently or rarely, and were less significant as potential vectors in the circumstances.

Arbovirus isolation

One hundred and ninety-eight mosquito pools were processed. RRV was not isolated from any of the specimens examined. However, a Stratford virus was isolated from a mosquito trapped on 8–9 April 1999.

DISCUSSION

The investigation of these notifications identified four cases of RRV infection that were acquired in Werrington, between January and March, 1999. While Amin et al. identified a cluster of cases in a rural setting in the Sydney basin,⁶ we believe that this is the first report of a cluster of RRV cases acquired in metropolitan Sydney.

The number of confirmed cases may have been limited by the need to obtain paired sera in order to rule out false positives and past infection. While each case and their doctor was made aware of the need for a second serology, this was not always obtained. Reliance on the cases to recall onset date, place of acquisition and travel history, may have also had an effect on the result of the investigation.

The trapping program undertaken at Werrington occurred when mosquito abundances were on the decline due to cooler autumn weather. Thus, the number and species collected may not be a true reflection of the activity during the warmer summer months, when vector populations would normally peak. However, several mosquito species that are considered important vectors of pathogens were trapped: *Aedes notoscriptus*, *Culex annulirostris* and *Culex annulirostris*.

Despite the intense trapping program, there were no isolates of RRV. Ross River virus activity may have ceased, however, as trapping occurred 2–5 weeks after the likely date of the majority of human infection acquisitions. Other viruses may have been active during this period, as evidenced by the isolation of Stratford virus in early April. It appears that the common domestic breeding mosquito, *Aedes notoscriptus* may have a role in the transmission of this virus which could become more common in NSW, with three other Stratford virus isolates collected from the Sydney region in 1999 from *Aedes notoscriptus* (Doggett and Russell, unpublished data). Clinical infections with Stratford virus have been recorded, with symptoms including fever, lethargy and arthritis.¹³

The close proximity of some outer western Sydney suburbs to natural woodlands, abundant macropod hosts and local vector breeding suggests that local residents may be at increased risk of RRV infection. General Practitioners in the area should consider the diagnosis of RRV infection in patients with consistent symptoms, even if there is no history of travel to endemic areas, and should encourage the collection of convalescent serology. Enhanced surveillance of human RRV infections and enhanced mosquito trapping activities in conjunction with local councils is being undertaken for the year 2000 season. Currently four traps are located within the Penrith region as part of the NSW Arbovirus Monitoring Program. The Werrington area is now included in the Program for the 1999–2000 season.

From a public health perspective there are a number of implications arising from these findings. Firstly, there is a greater realisation of the potential for RRV activity to spread to metropolitan areas. There is an increased need for collaboration between a number of agencies and professionals to provide enhanced disease surveillance and identification of mosquito vectors. Secondly, there is a health promotion component, which indicates a greater need for accessible community information regarding personal protection methods in areas not previously known to be endemic for RRV.

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INFECTIOUS DISEASES, NSW: JULY 2000

TRENDS

Laboratory-confirmed cases of **mumps** have increased recently, with 24 notified in the three months to the end of May 2000. Twenty-five cases were notified in 1999, 39 in 1998, 29 in 1997 and 27 in 1996. Of the 24 cases notified in the last three months, 95 per cent were from Sydney, 71 per cent were aged between 5–24 years, and 62 per cent were males. Laboratory-confirmed cases of mumps are likely to represent only a small fraction of all infections occurring in the community.

Reports of **Ross River virus** infection rose in May 2000, with 295 cases notified from a number of rural Areas. Notifications of **legionnaires disease** increased with seven cases reported in April. Investigation of these seven cases

showed no common causal links. No cases of **measles** were notified in May (see Table 7, Figure 8).

UPDATED INFECTIOUS DISEASE NOTIFICATION FORMS

Doctors, hospital and laboratory staff will be pleased to learn that forms for the confidential notification of scheduled medical conditions (that is, conditions reported in the Bulletin), including special forms for the notification of AIDS and death following HIV, have been updated and are available on the Internet. All forms are provided as Acrobat PDF files and are available from www.health.nsw.gov.au/public-health/forms. Notifications of scheduled conditions should be made by telephone or mail to the local public health unit, and cannot be made via the Internet. ☞