

Japanese encephalitis virus in Australia: a need for continued vigilance

In Australia, an outbreak of Japanese encephalitis occurred in northern Queensland in the late 1990s (<https://doi.org/10.5694/j.1326-5377.1999.tb127878.x>) and a case was identified in the Northern Territory tropical coast in February 2021 (<https://doi.org/10.3390/v14112480>). In 2021, an outbreak of Japanese encephalitis was reported in Australian states and territories following heavy rainfall and flooding caused by a La Niña event (<https://doi.org/10.3390/tropicalmed7060085>).

The *Medical Journal of Australia* documents a couple of cases of Japanese encephalitis arising from the outbreak that began in 2021. Previously, Allen and colleagues (<https://doi.org/10.5694/mja2.51905>) explained that Japanese encephalitis is usually a childhood disease in endemic regions, but in Australia, older people are at higher risk of symptomatic disease. Diagnostic methods for Japanese encephalitis include serology, nucleic acid detection using polymerase chain reaction, and neuroimaging with magnetic resonance imaging (MRI). Vaccination is recommended to prevent Japanese encephalitis, with two vaccines available in Australia. The authors posit that the diagnostic paradigm for encephalitis needs to be updated to reflect new developments, such as the emergence of COVID-19 and advances in molecular diagnostics. Surveillance and improved pathogen-specific treatments are needed to address the challenges of encephalitis.

In 2022, Zhu and colleagues (<https://doi.org/10.5694/mja2.51545>) discussed a case of Japanese encephalitis in a four-month-old infant in Victoria, Australia. The infant presented with febrile convulsions and was found to have characteristic investigation findings, including a lymphocyte-predominant cerebrospinal fluid pleocytosis, diffuse electroencephalogram slowing, and bilateral thalamic lesions on MRI scan. In 2023, Proudmore and colleagues (<https://doi.org/10.5694/mja2.52072>) documented a case of a 77-year-old man who was initially misdiagnosed as having Murray Valley encephalitis. While caravanning through the Northern Territory, the patient was bitten by mosquitoes and subsequently developed confusion, fever, headache, ataxia and expressive dysphasia. After admission to the hospital, initial serology samples were negative for endemic flaviviruses, but repeat serology revealed a positive result for Murray Valley encephalitis virus (MVEV). Later tests showed positive antibodies for Japanese encephalitis virus (JEV) and MVEV. A main message from this article is that ongoing surveillance is needed due to the structural similarities and cross-reactivity of different flaviviruses.

In this issue of the *MJA*, two studies investigated the prevalence of JEV antibodies in regions of New South Wales and Victoria in Australia in 2022. Marsland and colleagues (<https://doi.org/10.5694/mja2.52344>) assessed the distribution and prevalence of JEV antibodies in northern Victoria. The incidence of JEV IgG-seropositivity was 3.3% (95% confidence interval, 2.2–4.8%). The serosurvey also tested for antibodies to MVEV and the Kunjin subtype of the West Nile virus (KUNV). Results showed evidence of past JEV, MVEV and KUNV infections in the region. Older adults were more likely to be JEV-seropositive, and there were no significant differences in infection rates between sexes. Contact with feral pigs was associated with JEV seropositivity. Exposure to water irrigation systems were associated with MVEV antibody seropositivity. The findings support the need for a JEV vaccination program and other prevention strategies in northern Victoria.

A cross-sectional serosurvey by Baldwin and colleagues (<https://doi.org/10.5694/mja2.52320>) was conducted in five high risk towns in NSW to determine the proportion of people with antibodies to JEV and identify risk factors for infection. Blood samples were collected from 917 participants, and 8.7% were found to be seropositive for JEV total antibody, with the highest proportions among individuals aged 65 years or older. The prevalence of JEV infection varied by town, and there were mixed associations between seropositivity and certain risk factors and protective measures. The findings highlight the expansion of the known risk areas for Japanese encephalitis in south-eastern Australia and emphasise the importance of vaccination, mosquito avoidance, and public health control measures to prevent outbreaks.

Both studies found evidence of past exposure to JEV in a small but significant proportion of participants with seropositivity increasing with age. No specific risk factors for JEV exposure were identified, except for a suggestion of exposure to feral pigs in the Victorian study. Marsland and colleagues also estimated the seroprevalence of two related flaviviruses in Victoria, MVEV and KUNV, with estimates of 3.0% and 3.3% respectively. These findings highlight the need for continued monitoring and vaccination strategies for JEV and related flaviviruses in Australia.

In their editorial, Mackenzie and Smith (<https://doi.org/10.5694/mja2.52319>) state that both studies had limitations, including the lack of age-matched controls and opportunistic participant recruitment. They suggest that the 2022 JEV outbreak in Australia was more extensive than initially thought, highlighting the need for vaccine recommendations and future surveillance activities. Accurate and reliable serological studies are essential in understanding the epidemiology and impact of JEV in Australia. The authors conclude that further research is needed to develop specific, cost-effective, and widely available species-specific flavivirus antibody tests.

Based on epidemiological risk, collaboration across agencies, the maturity of response activities, and Australia's preparedness, the Australian Government announced in 2023 that JEV infection is no longer considered a Communicable Disease Incident of National Significance (<https://www.health.gov.au/news/statement-on-the-end-of-japanese-encephalitis-virus-emergency-response>) and that the need for a nationally coordinated emergency response has reduced. This nationally coordinated response included securing immediate access to vaccines, raising awareness with health professionals, informing the public about the importance of avoiding mosquito bites, and improving understanding of spread through enhanced mosquito surveillance and control. Since January 2021, 45 people in Australia have been infected with JEV, resulting in seven deaths. However, no new human cases have been reported in Australia since December 2022. Although the national emergency response has ended, JEV infection remains a nationally notifiable disease for both humans and animals. The cases described here suggest that there is a need for continued vigilance. ■

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