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Letter to the Editor

Dengue virus infection in Australia following occupational exposure: A reflection of increasing numbers of imported cases

To the Editor,

Nosocomial transmission of dengue virus has been reported infrequently previously, and never in an Australian health care worker (HCW). During a period when higher than normal numbers of individuals returned to Western Australia with dengue virus infection, particularly from Bali, such a case occurred.

In January 2011, a 27-year-old junior doctor presented to a Western Australian Infectious Diseases department with a three day history of fever, myalgia, and retro-orbital headache. She had not left the Perth region for over three months. Temperature

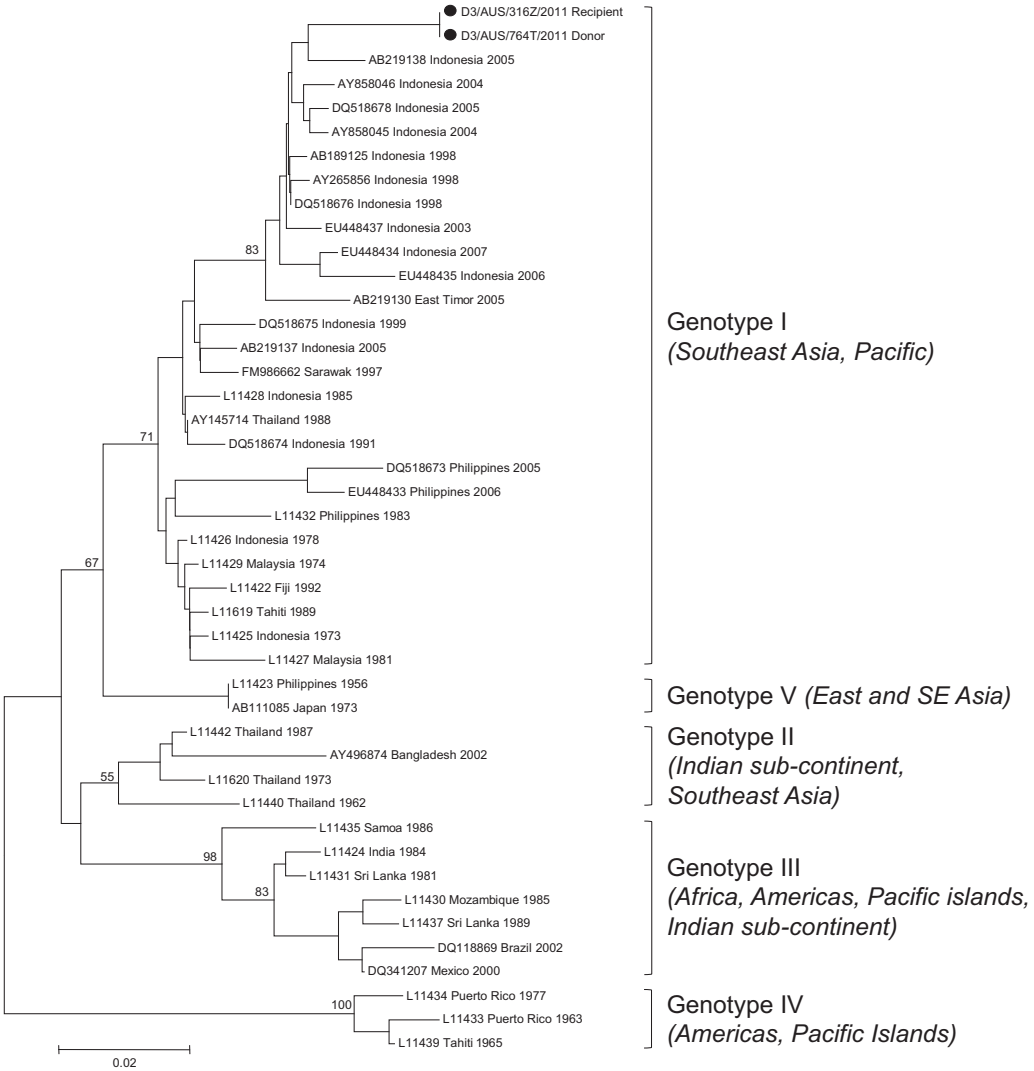

Fig. 1. Phylogenetic tree showing the relationship of the donor/recipient strain of dengue virus type 3 (DENV-3) with 42 reference sequences. Each of the 5 recognised genotypes are indicated (G1–G5) along with the geographic origins of their constituent strains. The DENV-3 sequences from this study are indicated by closed circles. The tree was constructed using MEGA5[7] by the neighbour-joining method and is unrooted. Nucleotide distances were calculated using the Maximum Composite Likelihood method from a 358 nt sequence of the envelope gene (position 2056–2413 of the DENV-3 H87 prototype strain genome [M93130]). Percentage bootstrap values from 1000 replicates are indicated for major nodes with a cut-off value of 50%. Scale bar represents nucleotide substitutions per site.

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was 38.1 °C, with an erythematous rash over the trunk. Leukocyte count was 3.66×10^9/L (4.0–11.0), lymphocyte count 0.83×10^9/L (1.2–4.0), platelet count 193×10^9/L (150–400), alanine aminotransferase 56 U/L (<35) and C-reactive protein 5.4 mg/L (<5). Peripheral blood cultures and malaria film were negative. Serology was negative for Epstein-Barr virus, cytomegalovirus and HIV.

Five days prior to symptom onset she sustained a penetrating needlestick injury to her index finger whilst taking blood. The donor patient had been admitted with a febrile illness following travel to Bali. Dengue virus immunoglobulin M (IgM) and NS1 antigen (ELISA) were positive, and dengue virus type 3 (DENV-3) RNA was identified by an in-house real-time RT-PCR. The doctor's serology also subsequently revealed positive dengue IgM, NS1 antigen, and DENV-3 nested RT-PCR.[1] She made a full recovery.

RT-PCR amplification and sequencing of a 358 bp region of the DENV-3 envelope gene (Genbank accession numbers JN021289 and JN021290) was performed on samples from both the doctor and the patient. Viral sequences were identical, confirming nosocomial transmission. Phylogenetic analysis using reference genomic sequences, representing each of the recognised genotypes of DENV-3, demonstrated that this strain clustered within genotype 1 (Fig. 1). It was most closely related to Indonesian strains isolated between 1998 and 2007 (97.2–97.8% nucleotide identity), consistent with the location where the donor patient is thought to have become infected.

This is the first described case of dengue virus infection occurring in a health care worker in Australia following occupational exposure. Currently, Australian dengue virus infection occurs only sporadically in far northern Queensland.

Dengue virus can be detected within a patient's blood during the entire febrile period and can be transmitted to a susceptible recipient via parenteral or mucosal exposure to viraemic blood. Transmission without a mosquito vector has been reported following needlestick injuries, bone marrow transplantation, blood transfusion, mucocutaneous exposure, intrapartum and vertical transmission.[2–4]

In 2010, dengue fever notifications in Western Australia increased by 250%, with about 2/3 acquired in Bali, Indonesia.[5] Bali received about 2.3 million foreign visitors in 2010, approximately 25% from Australia. As well as an increasing number of visitors, there is increasing dengue incidence in Bali. In Indonesia 33,443 cases were reported in 2000, increasing to 156,052 cases in 2009.[6]

Though common concerns are the transmission of HIV, hepatitis B virus, and hepatitis C virus, HCWs should be aware that nosocomial transmission of other viruses can occur following occupational exposure, and must be vigilant when caring for patients with illnesses following overseas travel.

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