A CONFIRMED CASE OF MURRAY VALLEY ENCEPHALITIS ACQUIRED AT CHANNEL POINT, NT.
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Case Report
A 83 year old non-indigenous male was admitted to Royal Darwin Hospital on 8/5/09 with suspected MVE (suspected onset date 4/5/09). A RDH doctor informed Medical Entomology (ME) of the suspected case on 11/5/09 but advised that test results were still pending. The first tests were conducted on 9/5/09, showing a weakly positive MVE IgM in CSF (negative for Kunjin and West Nile), a positive PCR, and a weak positive arbovirus serology HI result for MVE (titre 40). Further tests were conducted on 11/5/09 and 15/5/09, but the MVE HI titre did not rise. Tests were also conducted for other viruses including Dengue, Stratford, Kokobera, Edge Hill and Alfuy, but the test results were negative. MVE was confirmed on 19/5/09. The patient remained in ICU showing symptoms of encephalitis, including confusion, fever and fitting, until he passed away on 23/5/09. ME received the Flavivirus Disease Case Investigation Form from CDC on 20/5/09. The patient’s fishing partner reported that the patient had been fishing at Wranglers Creek and other areas at Channel Point for three and a half weeks since Easter, experiencing moderate mosquito numbers at dawn and dusk only. The patient has not been to any other areas, and there was anecdotal evidence that the patient did not usually practice personal protection, such as using insect repellent.

ME sentinel chicken surveillance and media warnings
From December 2008 to April 2009, sentinel chickens in Jabiru, Coastal Plains, Katherine, Nathan River, and Tennant Creek, and in the Kimberley region of WA have seroconverted to MVE. Further chickens from the Coastal Plains, Katherine, Jabiru, Tennant Creek and Alice Springs flocks seroconverted to flavivirus only at this stage.

On 29th January 2009 a MVE media warning for the entire NT was issued by DHF, based on sentinel chicken seroconversions in Katherine and Nathan River chickens. Due to a fatal MVE case in the Batchelor area in March 2009, an additional media warning was released on 20/3/09. After ME was notified of the suspected Channel Point MVE case, a further media warning was released on 15/5/09 and another one on 19/5/09, when the case was confirmed. A follow up warning was issued 27/5/09 after the death of the patient.

Mosquito investigations
Two ME Technical Officers set five adult mosquito CO2 baited encephalitis virus surveillance (EVS) traps at Channel Point on 12/5/09, at the northern and southern end of the Channel Point community, at the patient’s accommodation during his stay at Channel Point, at the northern end of the airstrip, and the Channel Point Reserve gate (see map 1). The traps were collected on 13/5/09 and most collected mosquitoes were processed for virus isolation between 13/5/09 and 19/5/09 at the ME laboratory. The processed mosquitoes were sent to the Berrimah Veterinary laboratory for virus isolation, which is continuing. During the visit mosquito self protection and control was discussed with the community caretaker, and personal protection information documents and disease fact sheets were also given to the community caretaker for information and distribution.

Mosquito larval surveys were carried out at locations close to the Channel Point community (see map 1). There was very little mosquito breeding located in these wetlands.
Climate information
Channel Point experienced significant rainfall in February 2009, with a total of 306mm, and 108mm in early March. Only 5.2mm of rainfall occurred in April, and there was no rainfall in May 2009 (BOM). However, large swamp areas north and south of the Channel Point community still contained large amounts of water, providing suitable mosquito breeding habitat since the end of the wet season.

Results of mosquito trapping & investigations
The Channel Point area adult mosquito trapping results showed high numbers of the main potential MVE vector, the common banded mosquito (*Culex annulirostris*), as well as high numbers of *Anopheles bancroftii* and *Coquillettidia xanthogaster* at all sites (see attached result sheet). *Culex annulirostris* breeds in temporary and longer term freshwater flooded areas and swamps with emergent vegetation. The high numbers in the traps indicated a severe pest problem, with 600 *Cx. annulirostris* per trap/night near breeding areas considered a pest level to nearby residents. *Anopheles bancroftii* and *Cq. xanthogaster* also breed in fresh water swamps, with 300 specimens per trap/night indicating a pest problem. However, at the time of the visit, only a very few *Cx. annulirostris* larvae were found breeding in the swamps in or adjacent to the community. *Culex annulirostris* has a flight range of from 2km to >10km, and an examination of aerial photos indicated that the majority of this species were probably coming from the extensive potential breeding sites within 10 km to the north and south of the Channel Point community. Both *An. bancroftii* and *Cq. xanthogaster* have a flight range of approximately 3 to 5km, indicating that these species were breeding in the same swamps, as well as a smaller contribution from the smaller wetland within the community.

Mosquito control is generally not feasible in rural areas such as this, due to the large extent of swamps and wetlands suitable for mosquito breeding, and the relative large cost to public benefit ratio.

The sentinel chicken results from December 2008 to April 2009 above, indicated widespread MVE or flavivirus activity in the Top End as far south as Tennant Creek, indicating a high risk period for contracting MVE existed in the general Top End.

Virus isolation results
Not yet available.

Conclusions
*Culex annulirostris* was most likely breeding in high numbers in the nearby swamp areas, within 5km to the north and south of the Channel Point community, and high numbers would have been present in the community around the acquisition date of the disease.

Sentinel chicken results from March and April 2009 also indicated widespread MVE virus activity in the Top End.

The incubation period for MVE is between 7 and 12 days. With an onset date of 4/5/09, the patient most likely contracted the disease around the 25/4/09 at Channel Point.

Although larval or large scale adult mosquito control in rural areas is not feasible due to the large extent of potential mosquito breeding sites and the high costs involved, there are
opportunities for personal protection and reduction in vector contact by using insect repellents and applying insect barrier sprays such as bifenthrin.

In summary, the patient most likely contracted the disease at Channel Point, due to the high numbers of *Cx. annulirostris* that would have been present during his visit. Although this case was contracted in this locality, a large area of the Top End of the NT was and remains receptive to this disease at this time of the year.
Map 1.

Channel Point adult mosquito CO2 trap sites and larval survey sites
## Adult mosquito non-monitoring results, Channel Point area 13/5/09

<table>
<thead>
<tr>
<th>Trap location</th>
<th>An. (Ano) bancroftii</th>
<th>Cq. (Coq) xanthogaster</th>
<th>Cx. (Cux) annulirostris</th>
<th>Cx. (Cux) palpalis</th>
<th>Ma. (Mnd) uniformis</th>
<th>Other species</th>
<th>TOTALS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No. of females</td>
<td>No. of males</td>
<td>No. of females</td>
<td>No. of males</td>
<td>No. of females</td>
<td>No. of males</td>
<td>No. of females</td>
</tr>
<tr>
<td>Channel Point 1, south end of community</td>
<td>212</td>
<td>0</td>
<td>829</td>
<td>0</td>
<td>2146</td>
<td>0</td>
<td>31</td>
</tr>
<tr>
<td>Channel Point 2, north end of community</td>
<td>283</td>
<td>0</td>
<td>1789</td>
<td>6</td>
<td>1463</td>
<td>0</td>
<td>130</td>
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<tr>
<td>Channel Point 3, Channel Point Reserve gate</td>
<td>866</td>
<td>0</td>
<td>259</td>
<td>2</td>
<td>2398</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>Channel Point 4, Residence in dense garden</td>
<td>75</td>
<td>0</td>
<td>296</td>
<td>0</td>
<td>877</td>
<td>2</td>
<td>69</td>
</tr>
<tr>
<td>Channel Point 5, north end of airstrip</td>
<td>16</td>
<td>0</td>
<td>450</td>
<td>0</td>
<td>1202</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Total No. of mosquitoes</td>
<td>1452</td>
<td>0</td>
<td>3623</td>
<td>8</td>
<td>8086</td>
<td>2</td>
<td>239</td>
</tr>
<tr>
<td>No. mosquitoes processed for virus isolation</td>
<td>1452</td>
<td>0</td>
<td>3596</td>
<td>0</td>
<td>7530</td>
<td>0</td>
<td>239</td>
</tr>
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