Tennant Creek dengue mosquito elimination program update

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Abstract

The dengue mosquito, Aedes aegypti, was detected in Tennant Creek in November 2011. A dengue mosquito elimination program was swiftly established by the Northern Territory Department of Health. The program was expected to end in June 2013 but was extended until April 2014 as low numbers of Ae. aegypti were still present in the town. The program is now in its eighth round of property inspections and treatment with no Ae. aegypti detected since June 2013. The program is expected to be declared successful at the end of April 2014.

Key words: exotic mosquitoes, Aedes aegypti, elimination program, Tennant Creek

Background

The dengue mosquito Aedes aegypti has not been found in the Northern Territory (NT) since the late 1950s, when it disappeared, most likely due to the introduction of irrigation systems. Incursions of this mosquito occurred in Tennant Creek in 2004 and on Groote Eylandt in 2006 but Ae. aegypti was eliminated from both locations after intensive elimination campaigns.

Most recently, the dengue mosquito was again discovered in Tennant Creek in November 2011, where it was found breeding in an ovitrap (mosquito egg trap). Subsequent surveys showed that the species was widespread in the town and an elimination program was swiftly established with funding provided by the Australian Government Department of Health and the NT Department of Health (DoH) until 30 June 2013.

The program involves rounds of property-by-property mosquito larval inspections and treatment of the 1115 main residential and commercial properties and hobby farms in Tennant Creek and the 107 residential properties in nearby communities. During these operations, every receptacle capable of holding water is inspected for mosquito larvae and treated with an insecticide to prevent mosquito breeding. In addition, the program involves adult mosquito surveillance and a media program to encourage public support.

To be considered successful the program requires that 1 round of property inspections is negative for Ae. aegypti during a wet season. The program has been carried out by Medical Entomology (ME) DoH in liaison with Environmental Health DoH, other CDC staff, volunteers, other government organisations and a dedicated elimination program team based in Tennant Creek.

The first round of property inspections and treatment commenced on 23 November 2011 and was completed on 8 February 2012. A total of 1070 properties were inspected, with 146 found positive for Ae. aegypti. Detailed survey and treatment results were reported in Whelan et al 2012.

This report summarises the elimination program activities carried out between February 2012 and February 2014.

Elimination program activities and results (February 2012 to June 2013)

Rounds 2-6 were completed between February 2012 and October 2013, with over 800 properties inspected in each round (median 1115). A summary of the findings is shown in Table 1.

In each of Rounds 3-6, only 1 property was found to be positive for Ae aegypti larvae. In Rounds 3 and 4 larvae were found in outdoor spas while in Round 5 they were found in a plant drip tray and in Round 6 in a dog bowl.

In Round 4, in addition to the larva in a spa pool, a Biogents® BG mosquito trap set at the Tennant Creek hospital also captured 1 adult female Ae. aegypti. Subsequent surveys in the trap vicinity did not detect Ae. aegypti breeding. Likewise in Round 5 an adult female mosquito was collected in a BG trap on the same property where larvae were found.

During Round 6, previously identified high risk properties were also revisited to ensure they were free of Ae. aegypti breeding.
Table 1. Summary of property inspection and treatment rounds 23 November 2011 to 14 February 2014

<table>
<thead>
<tr>
<th>Round</th>
<th>Start date</th>
<th>End date</th>
<th>Properties inspected and treated</th>
<th>Properties positive for <em>Ae. aegypti</em></th>
<th>Receptacles positive for <em>Ae. aegypti</em></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>23/11/2011</td>
<td>8/02/2012</td>
<td>1070</td>
<td>146 (13.6%)</td>
<td>197</td>
</tr>
<tr>
<td>2</td>
<td>9/02/2012</td>
<td>16/03/2012</td>
<td>822</td>
<td>14 (1.7%)</td>
<td>17</td>
</tr>
<tr>
<td>3</td>
<td>19/03/2012</td>
<td>9/10/2012</td>
<td>1208</td>
<td>1 (&lt;0.1%)</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>12/10/2012</td>
<td>8/02/2013</td>
<td>1128</td>
<td>1 (&lt;0.1%)</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>11/02/2013</td>
<td>8/4/2013</td>
<td>1115</td>
<td>1 (&lt;0.1%)</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>9/04/2013</td>
<td>6/10/2013</td>
<td>1115</td>
<td>1 (&lt;0.1%)</td>
<td>1</td>
</tr>
<tr>
<td>7</td>
<td>7/10/2013</td>
<td>6/01/2014</td>
<td>1092</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>8</td>
<td>7/01/2014</td>
<td>30/04/2014</td>
<td>812</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(14/2/2014)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td>8362</td>
<td>164</td>
<td>218</td>
</tr>
</tbody>
</table>

Rainwater tanks

During the elimination program, all 84 known rainwater tanks were inspected for *Ae. aegypti* breeding and sealed or rectified to prevent the ingress and egress of mosquitoes. Tanks found breeding were treated with insecticides (s-methoprene).

Side entry pits and septic tanks

In October 2012 all side entry pits in Tennant Creek were cleaned by the Barkly Shire Council and insecticide treated by the elimination team using alpha-cypermethrin and s-methoprene. All side entry pits were re-treated in March 2013, and septic tanks located in public use areas and hobby farms treated with Baytex 550®.

Community inspections

Other NT population centres where *Ae. aegypti* larval surveys were carried out between November 2011 and June 2013 included Ti Tree, Ali Curung, Renner Springs, Three Ways, Elliott and Bootu Creek.

Media and public relations

Throughout the elimination program, media releases were issued to raise awareness and to seek public cooperation. A postal letter drop was organised early in the program to inform the public of expected program activities.

Elimination program continuation (July 2013 to April 2014)

Following the detection of *Ae. aegypti* in Round 5 (April 2013), it was evident that the elimination program needed to be continued to ensure the successful elimination of the dengue mosquito from Tennant Creek.

In May 2013, funding was extended by the Australian Government to continue the program until the end of April 2014.

Rounds 7 and 8 took place between October 2013 and March 2014 and the results are summarised in Table 1. No *Ae. aegypti* were found in Rounds 7 and 8.

Discussion

During previous incursions in Tennant Creek in 2004 and on Groote Eylandt in 2006, *Ae aegypti* was eliminated over a 2 year period. Although *Ae. aegypti* numbers rapidly decreased after the Round 1 of property inspections and treatment during the current incursion this species was detected in April 2013 close to the end date of the initial funding period. To ensure the successful elimination of the dengue mosquito from Tennant Creek the program was extended from July 2013 until April 2014 and is now in Round 8 of property inspections and treatment.

Since November 2013 substantial rain occurred in Tennant Creek with a total of 40mm recorded.
in November and 42mm in December 2013. A further 252mm of rain has been recorded since January 2014. This rain would have been sufficient to trigger hatching of any dry *Ae. aegypti* eggs still present in receptacles. Therefore, rounds 7 and 8 of property inspections and treatment were considered crucial in determining the presence or absence of *Ae. aegypti* in Tennant Creek.

Until the end of April 2014, enhanced adult mosquito surveillance will be carried out in areas where the dengue mosquito was last found, and properties previously positive for *Ae. aegypti* re-inspected in an effort to detect any cryptic breeding sites. All rainwater tanks will also be re-visited to ensure they are properly sealed to prevent mosquito breeding.

If no further *Ae. aegypti* are detected by the end of April 2014, the dengue mosquito elimination program will be declared successful and the NT will be again free of the dengue mosquito.

**Acknowledgements**

We would like to thank all ME, EH, CDC and National Critical Care Trauma Response Centre staff and volunteers who assisted with the dengue mosquito elimination program in Tennant Creek for their tremendous contribution. We would also especially like to thank John Cusack and James Billings for the program supervision in Tennant Creek and the Commonwealth Department of Health for providing essential funding.

**References**


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**World TB Day 24 March 2014**

**Reach the 3 million**

*TB test, treatment and cure for all*

*Meredith Neilson, Liz Stephenson and Vicki Krause, Centre for Disease Control, Darwin*

World TB Day, held on 24 March each year, is designed to build public awareness that tuberculosis (TB) today remains an epidemic in much of the world, causing the deaths of nearly 1.5 million people each year, mostly in developing countries.

The 2014 campaign promotes that while TB is curable, current efforts to find, treat and cure everyone who gets TB in the world are not sufficient. Of the 9 million people a year who get sick with TB, a third of them do not get the TB services they need. Many of these ‘missed’ 3 million people live in the world’s poorest and most vulnerable communities.

The Stop TB Partnership, a collective force with nearly 1000 partners, operates through a secretariat hosted by the World Health Organization (WHO) and believes that no one should be left behind in the fight against TB. The 2014 World TB Day, called for a global effort to find, treat and cure the 3 million and accelerate progress towards zero TB deaths, infections, suffering and stigma.

The Stop TB Partnership state that “to reach the 3 million we need to aggressively scale up TB programs and ensure access and coverage for all, especially for the most vulnerable groups and in the areas most heavily affected by the diseases.

Investment in research and development is needed for the new tools - diagnostics, drugs and vaccines - in order to reach people faster, treat them more quickly and ultimately prevent them