The Future of Arboviral Surveillance in Georgia

Rosmarie Kelly - GDPH
What have we lost?

- Funding at the GDPH to support mosquito surveillance
- Funding for arboviral testing
- Basically, almost all the funding associated with arboviral surveillance in Georgia
- Current and future data
Before we give up completely...

1. What historic data are currently available?
2. What resources are still available?
3. How can these things be combined to provide at least some prediction of risk?
Historic data

- There are mosquito data from 98 out of the 159 Georgia counties.
- The GDA has provided data on livestock cases in 109 counties since 2001.
- There are dead bird data from 151 counties.
- The GDPH has collected human case data from 66 counties.

<table>
<thead>
<tr>
<th>2001-2011</th>
<th>human cases</th>
<th>veterinary cases</th>
<th>mosquito pools</th>
<th>positive bird</th>
</tr>
</thead>
<tbody>
<tr>
<td>total</td>
<td>272</td>
<td>1269</td>
<td>311</td>
<td>1894</td>
</tr>
<tr>
<td>mean</td>
<td>24.7</td>
<td>115.4</td>
<td>28.3</td>
<td>172.2</td>
</tr>
<tr>
<td>year</td>
<td>WNV+ pools</td>
<td>counties doing surveillance</td>
<td># positive counties</td>
<td>total mosquitoes pools tested</td>
</tr>
<tr>
<td>------</td>
<td>------------</td>
<td>-----------------------------</td>
<td>---------------------</td>
<td>------------------------------</td>
</tr>
<tr>
<td>2001</td>
<td>30</td>
<td>2</td>
<td>1</td>
<td>597</td>
</tr>
<tr>
<td>2002</td>
<td>91</td>
<td>11</td>
<td>6</td>
<td>4044</td>
</tr>
<tr>
<td>2003</td>
<td>106</td>
<td>27</td>
<td>6</td>
<td>6206</td>
</tr>
<tr>
<td>2004</td>
<td>126</td>
<td>60</td>
<td>7</td>
<td>10166</td>
</tr>
<tr>
<td>2005</td>
<td>67</td>
<td>59</td>
<td>5</td>
<td>15263</td>
</tr>
<tr>
<td>2006</td>
<td>81</td>
<td>26</td>
<td>5</td>
<td>4786</td>
</tr>
<tr>
<td>2007</td>
<td>75</td>
<td>28</td>
<td>7</td>
<td>6513</td>
</tr>
<tr>
<td>2008</td>
<td>51</td>
<td>28</td>
<td>5</td>
<td>6386</td>
</tr>
<tr>
<td>2009</td>
<td>24</td>
<td>26</td>
<td>4</td>
<td>4447</td>
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<tr>
<td>2010</td>
<td>99</td>
<td>22</td>
<td>5</td>
<td>5991</td>
</tr>
<tr>
<td>2011</td>
<td>438</td>
<td>18</td>
<td>7</td>
<td>9584</td>
</tr>
<tr>
<td>2012*</td>
<td>114</td>
<td>6</td>
<td>5</td>
<td>4658</td>
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</tbody>
</table>
Current resources

- In Georgia, 6 counties and one city are doing surveillance AND sending mosquito pools for testing.
- At least 4 counties have submitted mosquito surveillance data to the GDPH, even though the mosquitoes are not being tested for virus.
- GDA is still supplying test data from livestock (mostly horses).
- GDPH continues to collect human case data.
- Blood banks are sharing PVBD information.
Counties in Georgia with WNV+ mosquitoes, birds, horses, or human cases reported between 2001-2011. Counties with no reported positives have done little to no surveillance; WNV is considered endemic in Georgia.
EEE is endemic in south Georgia.
LAC is very under-reported in Georgia.
Using the data - what are other states doing?
Predictions of risk are based on a number of different factors including weather, current and past instances of human or animal disease, mosquito habitat, recent findings of virus in mosquitoes and estimates of mosquito population levels.
• CDPH has coordinated a statewide mosquito-borne encephalitis surveillance program since 1969 to detect western equine encephalitis (WEE), St. Louis encephalitis (SLE), and other viruses.

• In 2000, CDPH and other agencies expanded the program to enhance the state's ability to detect WNV.

• Reporting and testing of dead birds and tree squirrels were added to the existing California surveillance system, which includes encephalitis case detection, mosquito testing, and monitoring of sentinel chickens.
Dynamic Continuous-Area Space-Time (DYCAST) risk maps (top) and timeline (bottom) of West Nile virus epidemic in Sacramento County, California, 2005

http://wwwnc.cdc.gov/eid/article/17/8/10-0411_article.htm
What sorts of data applications are being used in Georgia?

It varies widely from county to county.
Areas of West Nile Virus (WNV) Risk Analysis
DeKalb County, Georgia
2012

Risk Analysis Areas
- Area 1
- Area 2
- Area 3

DeKalb County, GA
Mosquito Bird
Human cases
West Nile virus Action Plan

The “Hot Zone”

In 2007, the treatment area was expanded based on high Culex numbers and increased WNv activity outside of the historic areas.

Currently, we treat ~12,000 catch basins during a single treatment cycle.

The expanded Hot Zone, 2007-present
How can we use our available data?

Locally

State-wide
Cx quinquefasciatus Surveillance
2001-2011

- WNV Index
- MEAN

mean mosquitoes per trap

WNV Index

Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec

week
Average Epi Curve, 2001-2011

- human cases
- horses
- birds
- mosquito pools

Week

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec

WNV+

WNV+ birds
Dougherty County
Culex quinquefasciatus
2001-2012
In conclusion,

- The future of arboviral surveillance in Georgia is far from ensured

- It may take some creativity, but we do have enough existing and historic data to help make somewhat informed decisions

- Some counties are better off than others, but their data can be helpful to a wider area
Stay informed!

Sign up to receive the arboviral summary and notifications of positive mosquito pools, birds, or veterinary cases in your health district.

### Internationally-Acquired Cases

<table>
<thead>
<tr>
<th>Month</th>
<th># cases</th>
<th>VIRUS</th>
<th>TRAVEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>June</td>
<td>1</td>
<td>Dengue</td>
<td>Jamaica</td>
</tr>
<tr>
<td>July</td>
<td>1</td>
<td>Dengue</td>
<td>not reported</td>
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</tbody>
</table>

### Mosquito Pools

<table>
<thead>
<tr>
<th>Virus Isolation</th>
<th>County</th>
<th># mosquitoes</th>
<th># pools</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chatham</td>
<td>2276</td>
<td>209</td>
<td></td>
</tr>
<tr>
<td>DeKalb</td>
<td>395</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>Glynn</td>
<td>419</td>
<td>24</td>
<td></td>
</tr>
<tr>
<td>Liberty</td>
<td>323</td>
<td>21</td>
<td></td>
</tr>
<tr>
<td>Lowndes</td>
<td>625</td>
<td>43</td>
<td></td>
</tr>
</tbody>
</table>

### Quick Stats

<table>
<thead>
<tr>
<th>Virus</th>
<th>Count</th>
<th>MOSQUITO POSITIVE</th>
</tr>
</thead>
<tbody>
<tr>
<td>WNV</td>
<td>500</td>
<td>21</td>
</tr>
<tr>
<td>EEE</td>
<td>1245</td>
<td>52</td>
</tr>
<tr>
<td>EEE</td>
<td>258</td>
<td>7</td>
</tr>
<tr>
<td>EEE</td>
<td>73</td>
<td>4</td>
</tr>
<tr>
<td>WNV</td>
<td>258</td>
<td>14</td>
</tr>
</tbody>
</table>

1. Adult mosquito
2. Larva
3. Pupa
4. Egg
5. Mosquito
ANY QUESTIONS?