Vector Borne Disease Surveillance in the Rio Grande Valley

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Lower RGV/Region 11
Lower RGV

• Hidalgo County
  • Population: 849,843
  • Median income: $34,782
  • Median age: 28.8

• Cameron County:
  • Population: 422,135
  • Median income: $33,266
  • Median age: 31.2

• Starr County
  • Population: 64,122
  • Median income: $26,172
  • Median age: 29.1

• Willacy County
  • Population: 21,810
  • Median income: $26,495
  • Median age: 32.3

Data from www.texas-demographics.com
## Disease Transmission

<table>
<thead>
<tr>
<th>Disease</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dengue</td>
<td>45 (24 local)</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Chikungunya</td>
<td>0</td>
<td>0</td>
<td>3 (1 local)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Zika</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>34 (6 local)</td>
<td>2</td>
</tr>
<tr>
<td>West Nile</td>
<td>3</td>
<td>4</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
Reasons for concern

• Poverty rates vary from 33.5% to 38.8%

• Residents living in *colonias*
  • May lack electricity, running water, waste removal

• Significant cross-border travel
  • 11 million people in 2015
  • Travel to MX for health care
Surveillance activities: DSHS (Region 11)

- Monthly Mosquito Roundup

- 14 participating jurisdictions/cities
  - Trap once per month, May-Nov

- Multiple traps
  - Provide traps, training, and specimen shipping

- Organized and coordinated by DSHS and local health department
Surveillance activities: Blood testing and trapping

• Zika testing: 3,156 blood samples tested (majority from pregnant females) since Jan 2017 from Hidalgo County

• Traps (CDC Gravid, light traps, BG Sentinel, aspirators) available for local cities and municipalities
  • In Hidalgo, majority of trapping done by county and McAllen
  • Regular trapping encouraged, but need to overcome obstacles
Surveillance activities: City of McAllen/UTRGV

- Working with CDC and Mexico –
  - 80 AGO traps, 320 oviposition traps
  - Mostly collecting *Aedes aegypti* (~70%)
Surveillance activities: Texas A&M

- AGO traps in *colonias* and other communities
  - Between 50 and 70 traps set weekly
  - Mostly collecting *Aedes aegypti*
- Screening mosquito pools and blood meal analysis
- Analyze larval productivity of different habitat types

Figure 2. Experimental design for Aim 1, which evaluates indoor and outdoor mosquito abundance in all 8 communities, and the same design for Aim 2, which will evaluate the intervention campaign using Autocidal Gravid Ovitraps (AGO). For Aim 2 and in year 1, 4 communities will receive AGO traps (Treatment) with 4 communities with no AGO traps (Reference) and then for year 2, the treatment and reference will be swapped.
Surveillance activities: UTRGV

- Weekly light traps since Spring 2016
  - 4 Spring
  - Light trap
- Adding BG Sentinel traps
- Focus on species identification
Barriers to effective surveillance

• Interest and desire is there, but lacking funds and personnel

• Local communication

• Non-standardized training/protocols for trapping
Education, training, and outreach

- South Texas Tropical Medicine and Vector-Borne Disease conference
  - Each spring since 2016
  - Provide research updates, overviews, surveillance results

- Texas A&M CEU workshops

- Talks to local communities about disease, surveillance, and prevention
UTRGV/WGCEVBD – planned surveillance

• Assist in finding trapping sites, determination of traps to use
• Mosquito identification
• Targeted mosquito testing for infection
• Screening of de-identified blood samples
  • “suspicious sample, needs further testing”
UTRGV/WGCEVBD – planned surveillance

- Testing with multiplex real-time PCR (ABI 7500)
  - Trioplex – CHIK/ZIK/DEN
    - If positive for DEN, follow-up with DEN strain kit
  - Eventually 2\textsuperscript{nd} WNV/SLE/WEE

- Confirmation techniques planned
  - Cell culture/sequencing
  - PRNT
  - ELISA