Responding to Zika: A Local Texas Public Health Perspective

Umair A. Shah, M.D., M.P.H.
Executive Director
Harris County Public Health & Environmental Services (HCPHES)
Governor’s Infectious Disease Taskforce Meeting
Austin, TX
May 6, 2016
What is Public Health?

“What we as a society do collectively to assure the conditions in which people can be healthy.”

-The Future of the Public’s Health in the 21st Century, Institute of Medicine, 2003
HCPHES & Harris County

- HCPHES serves as the county health department for Harris County (TX) with over 700 public health professionals
- Third most populous county in nation with estimated population of 4.34 million
- Spread over 1,778 square miles (larger than the state of Rhode Island)
- Geographically, politically, and socio-demographically diverse and growing
- Home to world’s largest medical center
HCPHES & Public Health: Behind the Scenes

Chronic Disease
Food Safety
Emergency Preparedness
Environmental Health
Infectious Disease
Injury
Social, Mental, and Emotional Wellbeing

The HCPHES Priority Public Health Issues for 2013-2018

[Images of various public health scenarios, including a laboratory setting, a hurricane, a supermarket, and a public meeting.]
Celebrating 50 Years of Mosquito Control in Harris County

1964
Vote to establish the Harris County Mosquito Control District.

1979
First occurrence of Aedes grossbecki found in Texas and identified in Harris County.

1980
Placement of CDC light traps into storm sewer system.

1985
First discovery and identification of Asian Tiger (Aedes albopictus) mosquito in the continental United States.

2001
Comprehensive response to rise in mosquito population due to tropical storm Allison.

2002
Expansion of weekly Mosquito Surveillance to ensure comprehensive mosquito surveillance for all of 268 operational areas.

2005
Establishment of a continually supported Mosquito Resistance Monitoring and Management Program.

2008
Comprehensive emergency response in the aftermath of Hurricane Ike, including aerial application of Dibrom to more than 1,000,000 acres.

2013
Incorporation of Dengue and Chikungunya Surveillance Program via BG traps.

2014
Use of VectorTests for Chikungunya virus.

2015
50 Year Celebration and broadening of other vectors to the Division’s mission.

1990s
Establishment of Education and Outreach team to do community based prevention education and establishment of the Mosquito Control Regional Workshop to educate professionals on mosquito control techniques and methods.

1980
First mosquito control agency in the United States to establish an in-house Virology Lab.

Social, Mental, and Emotional Wellbeing
Zika Virus – Setting Context

- **Mosquito-born**e disease of concern due to: 1) rapid geographic spread; and, 2) association with birth defects
- 1 in 5 people infected become ill so **80% are asymptomatic**
- **Usually** not cause of severe disease or hospitalizations – that said, worry for microcephaly, Guillen-Barre Syndrome, and rarely even death
- Symptoms **generally mild**, lasting 3-7 days:
  - fever, rash, joint/muscle pain, conjunctivitis (red eyes)
- Now we know Zika can be **spread sexually** – especially important for pregnant women
- **All age** groups can be affected
- Currently **no vaccine** to prevent Zika infection
How is HCPHES Preparing to Respond to Zika?
January 11, 2016 - HCPHES Confirms First Texas Zika Case

The Wall Street Journal
Texas Woman Diagnosed With Mosquito-Borne Zika Virus
Development raises concern that health crisis in Brazil is spreading

FOR IMMEDIATE RELEASE
January 11, 2016

Travel-Related Zika Virus Infection Has Been Identified in the Harris County Area

Harris County, Texas - Harris County Public Health & Environmental Services (HCPHES) has received confirmation from the Centers for Disease Control and Prevention (CDC) that the Zika virus has been confirmed in a traveler who recently returned from Latin America. The individual developed symptoms that are often associated with the Zika virus which include fever, rash, and joint pain.

Zika virus is spread through the bite of the female Aedes species mosquito. Prevention is key to reducing the risk of Zika virus infection,” stated Ghasi A. Shuk, MD, MPH, Executive Director of HCPHES. “Zika virus infections occur throughout the world. We encourage individuals traveling to areas where the virus has been identified to protect themselves against mosquito bites, and to contact their healthcare provider immediately if they develop Zika virus-like symptoms.

According to CDC, illness from Zika is usually mild with symptoms lasting several days to a week. Severe disease requiring hospitalization is uncommon and deaths are rare. There is no vaccine to prevent or treat Zika virus infection. The CDC recommends that all people, especially pregnant women, who are traveling to areas where Zika virus is found, should take precautions to avoid mosquito bites to reduce their risk of infection with Zika virus as well as other mosquito-borne viruses such as dengue and chikungunya.

HCPHES recommends that travelers wear long-sleeved shirts and pants, use an insect repellent that contains DEET, and stay in air-conditioned rooms. To reduce risk, travelers should stay indoors from dusk to dawn to avoid mosquito bites.

To learn more about the Zika virus, please visit www.cdc.gov and www.cdc.gov

HCPHES is the local public health agency for the Harris County, Texas jurisdiction. It provides a wide range of services and resources aimed at improving the health and well-being of the Harris County community. For more information, please visit www.hcuphes.org.

Follow HCPHES on Twitter @HCPHES and like us on Facebook.

www.hcuphes.org
HCPHES Planned Zika Response Levels

- **Level 4 - Normal Conditions**: No cases of locally acquired Zika in Harris County
- **Level 3 - Increased Readiness**: One case of locally acquired Zika in Harris County
- **Level 2 - High Readiness**: A few or cluster of cases of locally acquired Zika within Harris County
- **Level 1 - Maximum Readiness**: Widespread cases of locally acquired Zika throughout Harris County

HCPHES Zika Response Team — formed January 7, 2016
The HCPHES Priority Public Health Issues for 2013-2018

- **Understand** *Aedes* vector predominance in Texas and Harris County
- **Recognize** need to shift from primarily *Culex*-based program to incorporation of *Aedes* mosquito as a targeted vector
- **Appreciate** importance of public education, personal protection, and source reduction as major tenets in fight against *Aedes*
- **Assure** “One Health” and health equity lens are applied to evolving multidisciplinary response

*Aedes albopictus*  
*Aedes aegypti*
Role of Health Equity, One Health, & MDT

Multi-Disciplinary Teams (MDT)
An internal team whose purpose is to conduct targeted mosquito, epidemiological, environmental assessments of household perimeters & proximate areas to determine need for interventions

Health Equity

One Health

Traditional view:
- Human health
- Vector control
- Animal health

One Health view:
- Human health
- Animal health
- Human and animal health interconnected

MDT
HCPHES Planned Zika Response Focus Areas

- Emergency Preparedness and Response
- Vector Surveillance and Control
- Legal Review and Authority
- Epidemiology Surveillance & Testing
- Environmental Public Health
- Health Care Provider/Clinical Outreach
- Veterinary Public Health
- Communications and Community Engagement
HCPHES Human Surveillance & Outreach

Epidemiology Surveillance & Testing

- Evaluate and monitor surveillance data for **travel-related** cases of Zika and identify emergence of **locally-acquired** Zika cases and alternate modes of transmission through regular surveillance.
- Monitor **clinical outcomes** of any women infected during pregnancy, congenital virus diseases, other atypical transmission routes (e.g. sexual transmission), and severe disease cases, including Guillain-Barre syndrome.

Health Care Provider/Clinical Outreach

- **Disseminate information** through the locally-operated Health Alert Network (HAN) regarding Zika national and local surveillance data with suspected modes of transmission and any new information when available.
- Work with local clinicians, hospitals, clinics, and other healthcare partners (e.g., blood bank, etc.) on **clinical situations** including in context of updates to clinical guidance for activities such as handling and testing of specimens, updating Zika testing sites, etc.
HCPHES Planned Zika Response Activities

Environmental Public Health

- Identify geographic areas in Harris County with a high prevalence of vector breeding sites through neighborhood nuisance abatement and vector-borne disease transmission.
- Utilization of GIS data collection application by field inspectors to report any neighborhood nuisance issues which may provide a breeding ground for mosquitoes.

Veterinary Public Health

- Send out a veterinary health alert network emails when new information is available.
- Provide consultation to veterinary professionals and the general public regarding Zika virus and pets, wild animals, or livestock, as applicable.
Legal Review and Authority

- Review legal issues relating to the specific vector borne disease to include evaluation of legal powers, insecticide spraying issues, authority to go onto private property, privacy issues, nuisance abatement, and emergency procurement
- Work with Harris County Attorney’s Office to enforce codes or initiate warrants if needed

Emergency Preparedness and Response

- Coordinate and communicate with Harris County partners regarding HCPHES activities relating to Zika virus
- Coordinate and train a multi-disciplinary team (MDT) to conduct epidemiological, environmental, and mosquito assessments when a symptomatic confirmed Zika case is reported within Harris County
HCPHES Communications and Engagement

- Conduct disease prevention education, personal protection, and source reduction campaigns
- Utilize media and other community partners to provide credible information to the public
- Distribute insect repellent and other prevention modalities when feasible and appropriate
- Create messaging in languages appropriate for affected communities, working with area consulates, etc.
- Conduct door to door education and outreach in targeted communities
- Engage federal, state, and local stakeholders/partners to coordinate efforts
Vector Surveillance and Control Activities

Mustapha Debboun, Ph.D, BCE
Director of Mosquito Control Division
Harris County Public Health & Environmental Services (HCPHES)
50 Years of “Fighting the Bite” – Primarily Against the *Culex* Mosquito

- Avian Surveillance
- Mosquito Surveillance
- Field Mosquito Control Operations
- Education & Training
- Mosquito Inspections
- Testing & Evaluation
- Virology Laboratory
- Geographic Information System (GIS)
Two Maps: The Presence of the *Aedes* Mosquito Equates to Increased Risk

*Source: CDC, presented at ZAP Summit, April 1, 2016*

HCPHES Vector Surveillance and Control

- Utilize **mosquito surveillance** using (limited) historical data on *Aedes* combined with (expanded) surveillance including incorporation of predictive modeling within the 268 operational areas.

- Generate **GIS maps** indicating key metrics such as mosquito population density levels of *Aedes*, Zika confirmed mosquito samples, local cases of human infections, and sources of breeding, etc.

- Conduct necessary **staff training** for inspectors, larvicide applicators, and other MC support personnel.

- Acquire testing materials and laboratory **equipment** for mosquito virology laboratory for Zika.

- Work with **partners** and community members on key issues around reducing mosquito habitats.
The HCPHES Priority Public Health Issues for 2013-2018

- Chronic Disease
- Food Safety
- Emergency Preparedness
- Environmental Health
- Infectious Disease

Biogents (BG) Sentinel Trap (Aedes)

Gravid Trap (Culex & Aedes)

CDC Storm Sewer Trap (Culex)
Environments Where *Aedes* Mosquitoes Thrive

- Stored water and discarded containers accumulate rain water and create abundant mosquito development sites.
<table>
<thead>
<tr>
<th>Epi-Week</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
<th>13</th>
<th>YTD</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Week ending</strong></td>
<td>02/19</td>
<td>02/26</td>
<td>03/05</td>
<td>03/12</td>
<td>03/19</td>
<td>03/25</td>
<td>04/2</td>
<td></td>
</tr>
<tr>
<td><strong>Total Traps Collected</strong></td>
<td>164</td>
<td>150</td>
<td>163</td>
<td>158</td>
<td>260</td>
<td>163</td>
<td>153</td>
<td>2,170</td>
</tr>
<tr>
<td><strong>Total Mosquitoes</strong></td>
<td>6,846</td>
<td>4,967</td>
<td>6,382</td>
<td>4,878</td>
<td>10,849</td>
<td>9,003</td>
<td>14,340</td>
<td>88,670</td>
</tr>
<tr>
<td><strong>Mean Mosquitoes/Trap</strong>²</td>
<td>41.74</td>
<td>31.44</td>
<td>39.15</td>
<td>30.87</td>
<td>41.73</td>
<td>55.23</td>
<td>120.49</td>
<td>49.50</td>
</tr>
<tr>
<td><strong>Total Mosquitoes Pooled</strong></td>
<td>9,680</td>
<td>2,692</td>
<td>3,594</td>
<td>3,028</td>
<td>4,886</td>
<td>4,400</td>
<td>4,619</td>
<td>42,528</td>
</tr>
<tr>
<td><strong>Mosquito Pools Tested</strong></td>
<td>138</td>
<td>109</td>
<td>140</td>
<td>130</td>
<td>230</td>
<td>146</td>
<td>142</td>
<td>1,727</td>
</tr>
<tr>
<td><strong>SLE Confirmed Pools</strong></td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>WNV Confirmed Pools</strong></td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>DEN/CHIK Confirmed Pools</strong></td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>ZIKA Confirmed Pools</strong></td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Culex quinquefasciatus</strong></td>
<td>6,196</td>
<td>4,447</td>
<td>5,942</td>
<td>4,671</td>
<td>10,155</td>
<td>8,401</td>
<td>12,812</td>
<td>61,421</td>
</tr>
<tr>
<td><strong>Aedes albopictus</strong></td>
<td>5</td>
<td>0</td>
<td>5</td>
<td>5</td>
<td>66</td>
<td>50</td>
<td>95</td>
<td>239</td>
</tr>
<tr>
<td><strong>Aedes aegypti</strong></td>
<td>4</td>
<td>2</td>
<td>8</td>
<td>3</td>
<td>30</td>
<td>11</td>
<td>27</td>
<td>125</td>
</tr>
</tbody>
</table>
Prevent the Bite...Day & Night

- Remove/empty containers that can hold water such as tires, flower pots, birdbaths, and toys; Keep rain gutters free of debris
- Install or repair screens on windows and doors
- Sweep up lawn clippings and leaves; Don’t feed the storm drain
- Eliminate mosquito breeding sources inside your home, too
- Wear insect repellent when outdoors
- Wear long-sleeve shirts, long pants and socks
Adult Mosquito Control Methods

- Adulticiding using Handheld sprayers
- Maintaining Window Screens on Homes
- CDC Autocidal Gravid Ovitrap (AGO) Trap
  - Population reduction
  - Field trials in Puerto Rico detected sustained reduction in *Aedes aegypti*
Zika Response: A Crossroads

- Emergency Preparedness and Response
- Vector Surveillance and Control
- Legal Review and Authority
- Epidemiology Surveillance & Testing
- Environmental Public Health
- Health Care Provider/Clinical Outreach
- Veterinary Public Health
- Communications and Community Engagement
Select Zika Response Challenges

- The situation related to Zika is one that continues to evolve
- “We cannot spray our way out of this situation”
- Additive Arbovirus Response: *Culex* -based activities plus *Aedes* -based activities
- Addressing Zika in the context of other ongoing departmental activities
- Funding and resource needs must be addressed (98% of HCPHES mosquito control activities are locally funded)
Texas Floods – Harris County (April 2016)

Storm caused the worst flooding Houston has seen in 15 years

A storm that hit Houston this week caused the city’s worst flooding in 15 years and left five people dead, officials said.

More than a thousand residents of apartment complexes in the northern

By Molly Henneasy-Fisher - Contact Reporter

APRIL 20, 2016, 11:15 AM | REPORTING FROM HOUSTON

Hurricane Harvey hit the area under a flash flood watch through Wednesday morning.

Photo Gallery

Your yard could be full of mosquito breeding sites! Be sure to DUMPandDRAIN standing water

ARE YOU RAISING MOSQUITOS IN YOUR YARD?

HCPHES

Your yard could be full of mosquito breeding sites! Be sure to DUMPandDRAIN standing water

hcpes.org/mc

Texas Floods - HCPHES Priority Public Health Issues for 2013 - 2018

Chronic Disease

Food Safety

Infectious Disease

Injury

Environmental Health

Emergency Preparedness

Social, Mental, and Emotional Wellbeing

HCPHES

Check out Selt's Protectors and award-winning UltraSharp Monitors today.

PREVENT THE BITES!
The Role of Local Public Health Just Makes “Common Sense”

Umair A. Shah, MD, MPH
Twitter: @ushahmd @HCPHES
www.hcphes.org
Follow us: