

DSHS Grand Rounds

November 30	<p>Zika: Looking Ahead</p> <p>Presenter: John Hellerstedt, MD Commissioner, Texas Department of State Health Services</p>	
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Peer-Reviewed Articles

- Congenital Zika Virus Infection: Beyond Neonatal Microcephaly
 - Melo et al., 2016
 - <https://www.ncbi.nlm.nih.gov/pubmed/27695855>
- Zika Virus: Immunity and Vaccine Development
 - Pierson & Graham, 2016
 - <https://www.ncbi.nlm.nih.gov/pubmed/27693357>
- Zika Virus Disease Cases – 50 States and the District of Columbia, January 1 – July 31, 2016
 - Walker et al., 2016
 - <https://www.ncbi.nlm.nih.gov/pubmed/27631604>
- Update: Interim Guidance for the Evaluation and Management of Infants with Possible Congenital Zika Virus Infection – United States, August 2016
 - Russell et al., 2016
 - <https://www.ncbi.nlm.nih.gov/pubmed/27559830>
- Essential Facts About Mosquito Control and Zika Virus
 - Goddard, 2016
 - <https://www.ncbi.nlm.nih.gov/pubmed/27555094>
- Zika Virus in the Americas: Early Epidemiological and Genetic Findings
 - Faria et al., 2016
 - <https://www.ncbi.nlm.nih.gov/pubmed/27013429>
- Update: Interim Guidance for Health Care Providers Caring for Women of Reproductive Age with Possible Zika Virus Exposure – United States, 2016
 - Petersen et al., 2016
 - <https://www.ncbi.nlm.nih.gov/pubmed/27031943>

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Introductions

Kirk Cole
Senior Advisor
Texas Department of State Health Services

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Zika Virus: Looking Ahead

John Hellerstedt, M.D.
Commissioner
Texas Department of State Health Services

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Overview

- Mosquito season is nearing a close, but continued vigilance is needed to ensure that local transmission in Texas is detected
 - Texas geography and U.S./Mexico border extends the risk of Zika beyond the month of October for certain parts of the state, particularly South Texas
 - Mosquito season ends later in Central and South America, posing additional risk due to higher levels of cross-border travel
- Focus at DSHS continues in three ways
 - Increased surveillance in the Rio Grande Valley, through encouraging enhanced Zika testing of humans by healthcare providers
 - Updating Zika response plans in preparation for next year's mosquito season
 - Preparing an application for federal Zika preparedness and response funds

Zika Virus Disease

- Most Zika infections do not cause illness (symptoms). If illness does occur, it is usually mild with symptoms lasting several days to a week
 - People usually don't get sick enough to go to the hospital, and they very rarely die of Zika
 - Symptoms of Zika are similar to other viruses spread through mosquito bites, like dengue and chikungunya
- Most common symptoms
 - Fever
 - Pruritic Rash
 - Joint pain
 - Conjunctivitis (red eyes)
- Other symptoms
 - Muscle pain
 - Headache

Zika Virus Transmission - *Mosquitoes*

- Primary way that Zika virus is transmitted to people via bite of an infected *Aedes* species mosquito (*Ae. aegypti* and *Ae. albopictus*)
 - Most efficient vector is *Ae. aegypti*
 - Same mosquitoes spread dengue and chikungunya
 - Prefer to bite people and live indoors and outdoors in close proximity to people
 - Aggressive daytime biters, but can also bite at night
 - Less sensitive to temperature change
- **Actively** infected (viremic) individual → mosquito → next individual
 - Mosquito takes blood meal from human and takes in the virus in the human's blood
 - After about 7-10 days the mosquito may pass the Zika virus to other humans when biting them

Estimated range of *Aedes albopictus* and *Aedes aegypti* in the U.S., 2016



These maps show

- CDC's best estimate of the potential range of *Aedes aegypti* and *Aedes albopictus* in the U.S.
- Areas where mosquitoes are or have been previously found



Source: www.cdc.gov/v/zika/vector/range.html

■ *Aedes aegypti* ■ *Aedes albopictus*

These maps DO NOT show

- Exact locations or numbers of mosquitoes living in an area
- Risk or likelihood that these mosquitoes will spread viruses



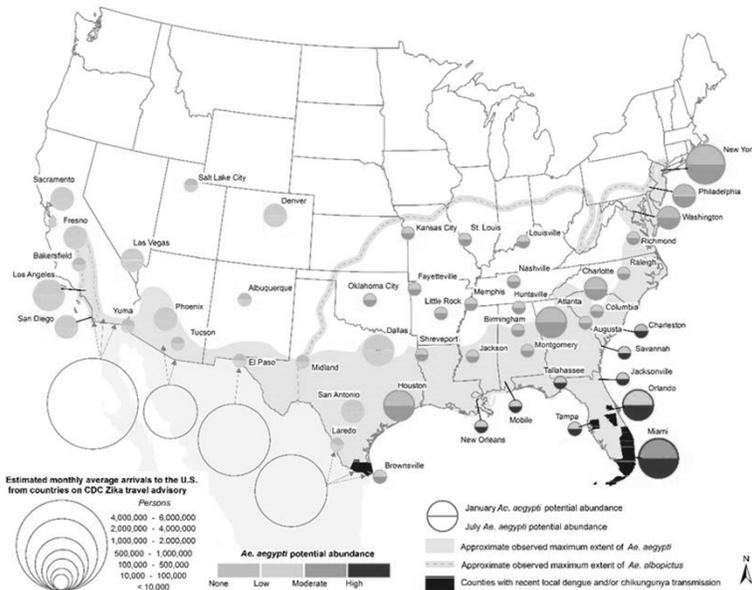
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Aedes Species Mosquitoes

Map shows

- 1) *Ae. aegypti* potential abundance for Jan/July (colored circles)
- 2) Approximate maximum known range of *Ae. aegypti* (shaded regions) and *Ae. albopictus* (gray dashed lines)
- 3) Monthly average number of arrivals to the U.S. by air and land from countries on the CDC Zika travel advisory

Source: On the Seasonal Occurrence and Abundance of the Zika Virus Vector Mosquito *Aedes Aegypti* in the Contiguous United States. PLOS Currents Outbreaks. 2016 Mar 16. Edition 1. doi: 10.1371/currents.outbreaks.50dfc7146798675fc63e7d7da563da76.



Zika Virus Transmission – *Other Methods*

- **Sexually**
 - Can be spread from person who has Zika to his or her sexual partners before, during, and after symptoms are present
 - Research shows that the virus might persist in semen longer than in blood and other bodily fluids
 - No cases of woman-to-woman Zika transmission have been reported
- **Mother to Child**
 - Zika virus can be passed from a pregnant woman to her fetus during pregnancy or at delivery
 - To date, no reports of Zika virus transmission through breastfeeding
- **Blood Transfusion**
 - Strong possibility that Zika virus can be spread through blood transfusions when donor is viremic at time of donation
 - FDA requirement to screen all blood donors with investigational nucleic acid amplification tests
 - To date no confirmed blood transfusion cases in the U.S.
 - Currently investigating multiple reports of blood transfusion transmission cases in Brazil
- **Other Bodily Fluids**
 - Research is ongoing related to the potential of transmission through other bodily fluids including tears, conjunctival discharge, saliva, vomitus, urine, or stool

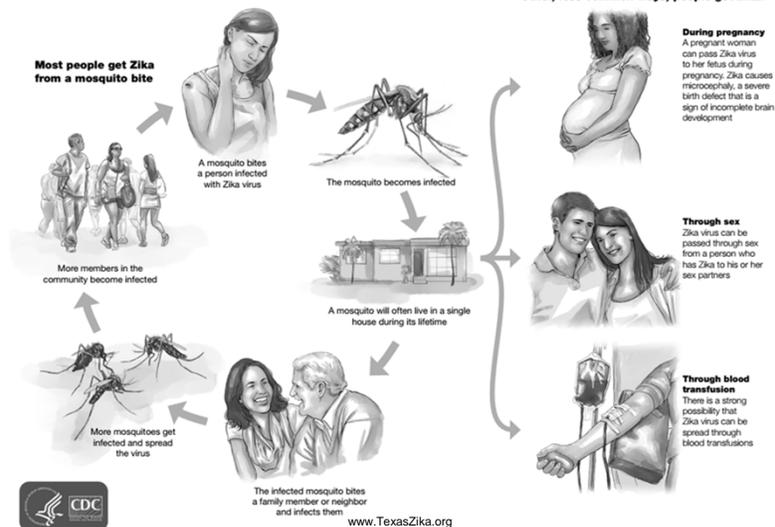


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Zika Virus Transmission

PROTECT YOUR FAMILY AND COMMUNITY: HOW ZIKA SPREADS



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Zika Health Effects and Risks

- **Microcephaly**

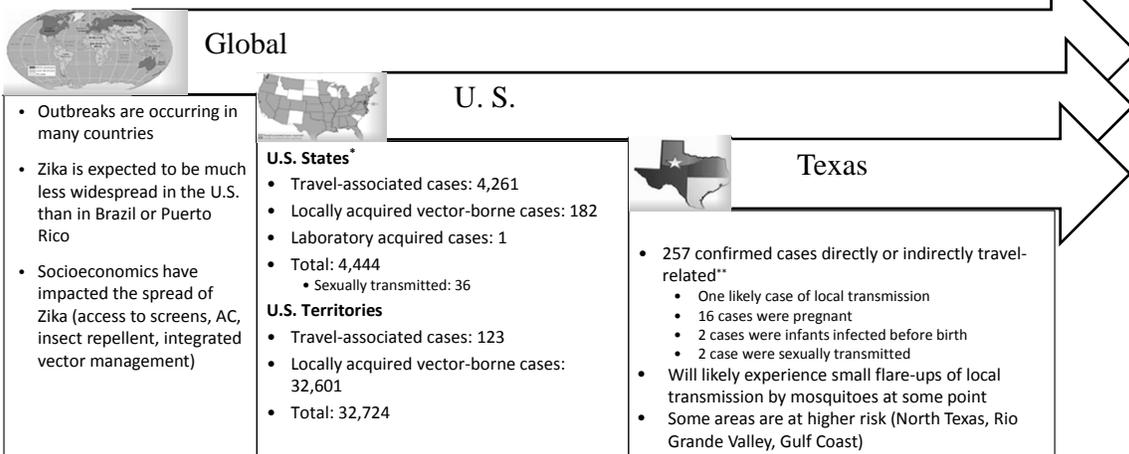
- Microcephaly is a birth defect where a baby’s head is smaller than expected
- Zika infection, especially in early phases of pregnancy, can severely disrupt fetal brain growth & development
- Other problems in infants linked to Zika virus include
 - Eye defects
 - Hearing loss
 - Impaired growth

- **Guillain-Barre Syndrome (GBS)**

- GBS is an uncommon disorder of the nervous system in which the immune system damages the nerve cells, causing muscle weakness, and sometimes, paralysis
- Research suggests that GBS is statistically strongly associated with Zika
 - Only a small proportion of people with recent Zika virus infection get GBS
 - Ongoing investigation by the CDC of the possible link between Zika and GBS



Zika - Situational Perspective



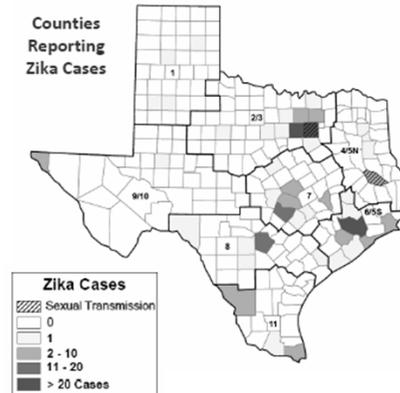
* As of November 23, 2016
 ** As of November 26, 2016



Zika – Current Texas Situation

As of November 26, 2016, Texas had **257** reported cases of Zika

- | | | |
|-----------------|-----------------|------------------|
| • Angelina (2) | • Galveston (8) | • Midland (1) |
| • Bastrop (1) | • Gray (1) | • Montgomery (1) |
| • Bell (6) | • Grayson (1) | • Palo Pinto (1) |
| • Bexar (17) | • Gregg (1) | • Parker (1) |
| • Brazoria (1) | • Hamilton (1) | • Randall (1) |
| • Brazos (3) | • Harris (69) | • Rusk (1) |
| • Burnet (1) | • Hidalgo (2) | • Tarrant (26) |
| • Cameron (5) | • Hockley (1) | • Travis (11) |
| • Collin (5) | • Jackson (1) | • Uphur (1) |
| • Dallas (44) | • Jefferson (2) | • Val Verde (1) |
| • Denton (9) | • Jones (1) | • Walker (1) |
| • El Paso (3) | • Lee (1) | • Williamson (5) |
| • Ellis (1) | • Lubbock (1) | • Webb (5) |
| • Fort Bend (9) | • Matagorda (1) | • Wise (1) |
| • Frio (1) | • Medina (1) | |



Local Transmission

- Reported first case of Zika virus disease likely transmitted by a mosquito in Texas
- Resident of Cameron County without any other known risk factors
- Close coordination between local officials, DSHS and CDC to increase public awareness (call to action), surveillance efforts and vector control activities in the area

Zika – Human Testing

- Two key diagnostic tests used to identify Zika in humans
- Reverse transcriptase polymerase chain reaction (RT-PCR)
 - Testing criteria, which was originally limited to specimens drawn within 7 days of onset of symptoms, has been expanded to include specimens collected within 14 days of symptom onset
 - DSHS laboratory
 - Capacity has increased from 150 specimens per week to 450 serum specimens per week
 - Can now test urine specimens when submitted with paired serum specimens as required by the protocol
 - A positive result for Zika is conclusive; Zika cannot be ruled out with a negative result
 - Positive PCR may be detectable for longer in whole blood samples
- Serum IgM Antibody (serology)
 - Used for specimens collected more than 14 days after symptom onset
 - DSHS laboratory capacity has increased from 96 to a maximum of 150 specimens per week
 - Presumptive positive result for Zika IgM is confirmed by the CDC

Zika – Human Testing

- DSHS revises testing criteria for humans with suspected Zika infection as appropriate
 - Current guidance specifies that individuals with three of the four symptoms (fever, rash, joint pain, and eye redness) could potentially meet testing criteria
 - Current guidance intended to better identify localized transmission; previous guidance only approved testing for certain individuals with a history of travel to areas of local transmission or those with an epidemiological link to a known Zika case
- Current guidance specifies that the following pregnant women would potentially meet testing criteria
 - Pregnant women who have traveled to a country with ongoing Zika transmission regardless of the presence or absence of symptoms, including those who regularly cross the U.S./Mexico border
 - This recommendation also applies to pregnant women who have a sexual partner with travel to a country with ongoing Zika transmission
 - Pregnant women in Cameron, Hidalgo, Starr, Webb, Willacy and Zapata counties without travel history who exhibit two symptoms associated with Zika
 - Pregnant women outside of the Rio Grande Valley without travel history who exhibit three symptoms associated with Zika

Zika – *Mosquito Testing*

- Each mosquito season, the DSHS laboratory receives mosquito samples and tests important vector species for the presence of arboviruses
 - Testing determines the presence of mosquitoes known to be a vector for specific viruses
 - Tests for the presence (or absence) of mosquitoes carrying the following viruses:
 - Zika
 - West Nile
 - St. Louis encephalitis
 - Chikungunya
 - Western and Eastern equine encephalitis
 - California serogroup
- This season, DSHS began receiving mosquito specimens for testing the week of May 6, 2016

Zika – *Mosquito Testing*

- Even if the tests show a lack of vector mosquitoes and/or lack of infected mosquitoes with virus, it does not rule out the presence of vector mosquitoes or infected mosquitoes from the jurisdictions submitting samples
- A rapid Zika-specific test was added this season and is currently used for mosquitoes collected in high-risk counties
 - Cameron, Hidalgo, Starr, Webb, and Willacy counties
- This season, over 50 entities from more than 30 jurisdictions have submitted mosquito specimens to for testing

Zika Prevention – *Mosquito Breeding and Biting*

Prevent Mosquito Breeding

- At least weekly empty containers that hold water
- Keep gutters clear of debris and standing water
- Remove standing water around structures and from flat roofs
- Change water in pet dishes daily
- Rinse and scrub vases and other indoor water containers weekly
- Change water in wading pools and bird baths several times a week
- Maintain backyard pools or hot tubs
- Cover trash containers
- Water lawns and gardens carefully, so water does not stand for several days
- Screen rain barrels and openings to water tanks or cisterns
- Treat front and back door areas of homes with residual insecticides if mosquitoes are abundant nearby
- If mosquito problems persist, consider pesticide applications for vegetation around the home

Protect Yourself from Mosquito Bites

- Wear EPA-registered insect repellants
- Keep mosquitoes out with air conditioning or intact window screens
- Cover up with long-sleeved shirts and long pants
- Limit outdoor activities during peak mosquito times

Zika Prevention – *Protecting the Blood Supply*

- Zika virus currently poses a low risk to the blood supply in the continental U.S., but this could change depending on how many people become infected with the virus
- On August 26, 2016, the U.S. Food and Drug Administration (FDA) issued revised guidance, which calls on blood collection centers to screen all donated blood for Zika virus
- There is no FDA-licensed test for Zika virus, but testing became available through two separate Investigational New Drug applications
- Beginning September 30, 2016, all Texas blood banks test all blood donors for Zika
- Blood donations that test positive for Zika are removed from the blood supply

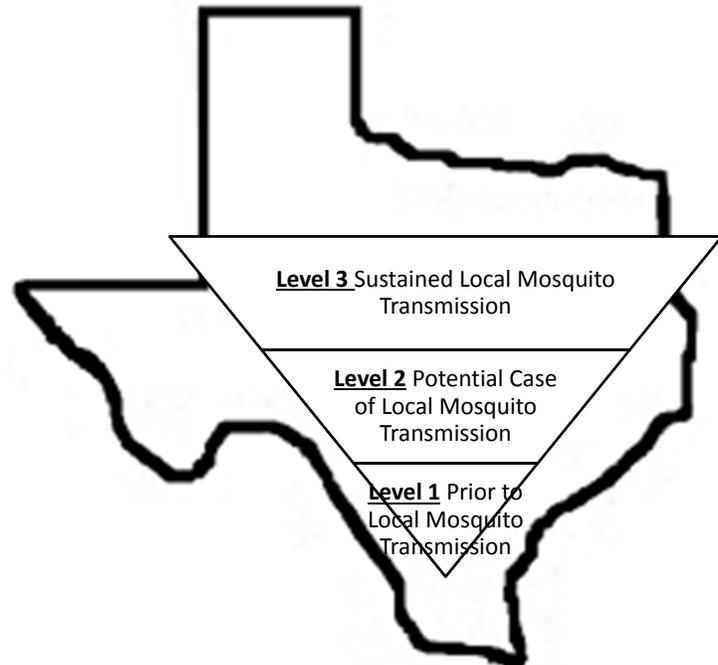
Zika Research – *Vaccine Development*

- There is currently no vaccine available for Zika, but research on vaccine development is occurring in earnest
- The National Institute of Allergy and Infectious Diseases (NIAID), part of the National Institutes of Health, has begun a clinical trial of a vaccine candidate intended to prevent Zika virus infection
 - A clinical trial that will evaluate the experimental vaccine’s safety and ability to generate an immune system response in participants has been planned
 - Initial safety and immunogenicity data from the Phase 1 trial are expected by January 2017
 - If results show a favorable safety profile and immune response, NIAID plans to initiate a Phase 2 trial in Zika-endemic countries in early 2017

Texas Zika Plan

Plan Format

1. Communications/Public Health and Medical Information
2. Mosquito Surveillance and Control
3. Health Surveillance
4. Command, Control, and Coordination



Texas Zika Actions

- Strategies used to protect our most vulnerable Texans must make scientific and public health sense
- Areas of focus to ensure we are doing everything we can **right now** to delay and prevent Zika
 - Communicate Precautions
 - Articulate Outlook
 - Expect Local Transmission
 - Define Area
 - Prevention – Now and Later
 - Describe Response Plan to Public

Texas Zika Actions – *Communicate Precautions*

- Communicate and educate clearly about prevention and recruit community volunteers to help amplify messages
 - Create barriers against mosquito bites
 - Create barriers in human habitats
 - Deny breeding habitats
 - Spraying adulticide
 - Most expensive and least effective
 - Attacks last and hardest link in the transmission chain
- DSHS has initiated several communication, education, and awareness activities
 - www.TexasZika.org
 - Public awareness campaign
 - Grassroots education sessions
 - Webinars and educational opportunities
 - Guidance document for schools and daycares

Texas Zika Actions – *Articulate Outlook*

- Articulate the Zika outlook, and what our response is going to look like
 - Be on top of evolving information and make honest estimations about expectations and plans for response
 - Expect small pockets of cases in limited clusters rather than widespread transmission
 - Response will be precision strikes in defined areas
 - People may be alarmed if they do not see the response they expect
 - Openness and candor **now**, builds trust
- Specifically, response to local transmission includes
 - Prompt communication of status and response plan
 - Redoubled prevention efforts
 - Guidance to local health care providers
 - Targeted integrated vector management within 150 meters of instances of vector transmission
 - Targeted community outreach and education across entire area

Texas Zika Actions – *Expect Local Transmission*

- Be on high alert and act fast when local transmission occurs
- Work together to analyze and respond to evidence of possible local transmission (symptom onset, travel history, mosquito exposure, lab results)
- Ensure consensus between local, state, and federal entities about whether local transmission has occurred
 - Characterizing a case as local transmission is collaborative
 - Because of the potential to cause great public concern, must work together to minimize confusion and anxiety

Texas Zika Activities – *Define Area*

- Have ability to precisely define the area of recommended testing for pregnant women when local transmission occurs
 - Define area in close coordination with local and federal partners
 - Likely an area of at least one mile in diameter centered on a public landmark or intersection to preserve privacy of known cases
 - Must be able to provide testing to all pregnant women who spend significant time in this defined area
 - Be on alert for signs of tests outstripping capacity
 - The area may grow or shrink depending on how events unfold
 - There may be smaller, more targeted vector control efforts within this area

Texas Zika Activities - *Countermeasures*

- Know and use our universal Zika countermeasures
 - The tools we have to prevent Zika are the same as those we have to combat it upon arrival
 - Priorities for prevention and response based on assessment of each community's risk profile
- Factors that increase risk include
 - Low public awareness of threat and prevention
 - Lack of access to barriers
 - Lack of barriers in structures
 - Presence of breeding habitats close by
 - Lower socioeconomic status
- **Greatest Challenge: The Call to Action**

Response Coordination - *Local, Federal, and International Partners*

- Planning and response efforts require collaboration at all levels
- Response activities are controlled at the local level
 - Local elected officials, local health entities, mosquito control districts, etc. are key to building relationships with the local health care community which are essential to an effective response
- Federal partners play an important role in response efforts
 - CDC provides resources, scientific expertise, and cross-state coordination
- Because Mexico is experiencing active local transmission, DSHS has made efforts to closely coordinate with public health partners on both sides of the U.S./Mexico border
 - Many people who live and work in the large and vibrant communities along the border regularly travel to Mexico for work, business, shopping, education or family

Looking Ahead – *South Texas*

- Amplify surveillance
 - The risk of local transmission will last longer in South Texas due to differences including geography and U.S./Mexico border
 - Public health in Texas must closely monitor the Zika transmission trends in Mexico
 - Providers must continue to screen patients and recommend testing for Zika when appropriate
- Continued coordination on mosquito control
 - In October, cooler temperatures mark the end of mosquito season for parts, **but not all** of Texas
 - DSHS continues to coordinate with locals to address mosquito control in parts of the state where mosquitoes are still active
 - Work with local public health entities across the state to plan for next mosquito season

Zika – *Looking Ahead*

- Expect Zika and other arboviruses to be an ongoing public health concern
 - Be prepared to continue prevention and response efforts after public interest subsides
 - Leverage lessons learned from past responses
- Texas challenge
 - Local control creates a system of autonomous public health entities that need to coordinate efforts
 - Large diverse state with a bi-national border
- DSHS must look forward to next mosquito season
 - State Legislature is meeting and may provide statutory direction
 - Governor’s Task Force on Infectious Disease Preparedness and Response is a multi-disciplinary group of experts to provide insight and recommendations
 - Ongoing dialogue between DSHS and public health stakeholders

Looking Ahead – *Funding Opportunities*

- Congress approved \$1.1 billion in funding for Zika
 - A significant portion of this funding will likely be used to reimburse Zika activities that have already taken place
 - \$397 million is expected to be used to fund vaccine and diagnostic research
 - DSHS is working on an application to request up to \$5 million through this grant opportunity
- DSHS has requested almost \$7 million in supplemental Epidemiology and Laboratory Capacity (ELC) grant funds
 - Funds would support local and regional vector control activities, pesticide resistance testing, equipment for the DSHS laboratory, and outbreak response and surveillance
- Lack of ongoing source of funding which coincides with the next mosquito season is a challenge
 - Exploring ways to utilize existing one-time funds to strengthen long-term response efforts
 - Soliciting input
 - Local health departments
 - Public Health Funding and Policy Committee
 - Task Force on Infectious Disease Preparedness and Response

Looking Ahead – *Zika Plan*

- Leveraging Florida’s experience with local transmission
 - Expecting small pockets of local transmission similar to Florida’s experience in the Miami area
 - Potential exists for mosquito resistance to pesticides to emerge
 - DSHS is engaging in resistance testing on Texas mosquitoes
- Updating the state’s Zika Plan
 - Reassess and update the plan based on the experience from the current mosquito season

Looking Ahead – *Long-Term Outlook*

- The risk of local transmission of Zika will continue every mosquito season
 - Similar to the West Nile Virus outbreaks, the impact will vary each year
 - The state must remain prepared to respond
 - Response activities must include everyday activities that also contemplate the risk of other mosquito borne diseases
- Local decisions are key
 - State role is to assist as locals make decisions about local efforts
- Human surveillance is a key component in identifying any local transmission

Zika – *The Big Picture*

- Mosquito season may be drawing to a close, but the risk to Texans **is not**
 - The rest of the country may move on, but Texas has work to do and must remain vigilant
- The time between mosquito seasons is important
 - Strengthen our decision making about future mosquito seasons
- The potential of a vaccine could provide a new tool to prevent infection
 - Tracking closely the progress of research and development of new treatment and vaccines
 - Adjust response plans, as needed



Kirk Cole, Senior Advisor, DSHS
Q & A Moderator

Questions and Answers

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DSHS Grand Rounds
Spring Semester 2017

- Wednesday, April 5, 2017
- Wednesday, April 12, 2017
- Wednesday, April 19, 2017
- Wednesday, April 26, 2017
- Wednesday, May 3, 2017
- Wednesday, May 10, 2017

