Zika Virus

- Genus Flavivirus
  - Single-stranded RNA virus
  - 3 Lineages: (2) African and (1) Asian
- 1947 – First Isolated in Zika Forest (Uganda)
- Other Flaviruses
  - West Nile virus
  - St. Louis Encephalitis virus
  - Dengue virus
  - Japanese Encephalitis virus
  - Yellow Fever virus
Zika Transmission

- **Mosquito Bites:** Zika virus transmitted to people via bite of an infected *Aedes* species mosquito (*Ae. aegypti* and *Ae. albopictus*).
  - Predominantly *Ae. aegypti*.
  - Same mosquitoes spread dengue and chikungunya.
  - **Actively** infected individual → mosquito → next individual.
  - Transmitted by mosquito but spread geographically by humans.
- **Sexually:** Zika virus can be spread to sexual partners
- **To Unborn Baby:** Zika virus can be passed from a pregnant woman to her baby during pregnancy or at delivery.

Yellow fever mosquito *Aedes aegypti*  
Asian tiger mosquito *Aedes albopictus*  

- Subgenus Stegomyia
- Both are invasive species that are firmly established
- 2 hours after sunrise and several hours before sunset are usually the optimal activity periods for these species, but can be active (and taking blood meals) anytime during the daylight hours
- Flight range of both species is limited to approximately 150 meters from emergence
- *Ae. aegypti* females take blood meals from humans exclusively; *Ae. albopictus* has a broader host range
- Cavity breeders (in evolutionary past); use artificial, water-holding containers for oviposition
- Synanthropophilic: close association with humans
- *Ae. aegypti* is the more efficient vector potential: multiple blood meals/gonotrophic cycle
Zika Virus Disease

- Most Zika infections are asymptomatic (estimated 80%)
  - Symptoms are usually mild
    - Fever, itchy rash, joint pain, conjunctivitis; can last several days to a week
    - Rarely causes death or requires medical care
  - Once a person has been infected, he or she is likely to be protected from future infections and can no longer pass the infection along

- Microcephaly
  - When infection passed to developing infant in the womb, Zika can interrupt brain development

- Guillain-Barré Syndrome (GBS)
  - Current CDC research suggests that GBS is strongly associated with Zika
  - Likely triggered by Zika in a small proportion of infections, much as it is after a variety of other infections
Zika Cases in U.S. as of October 5, 2016
Travel–Associated 3,712; Sexual Transmission 30; Mosquito-Transmission 105; Guillain-Barré syndrome 13


Cases in Texas
As of October 6, 2016

This count includes 13 pregnant women, two infants infected before birth, and two people who had sexual contact with a traveler.
Texas Outlook

- Texas may well experience local transmission of Zika virus by mosquitoes at some point
- As with dengue, local transmission would not likely be sustained
- Many areas of Texas support *Ae. aegypti* and have concentrated human population; conditions that may facilitate local transmission
- Some areas are considered at higher risk – the Lower Rio Grande Valley, Gulf Coast, and large urban areas
Mosquito Surveillance and Control Infrastructure

- Approximately 73% of the Texas population resides in a jurisdiction which has an integrated vector management program (IVM)
  - This calculation is based on a survey of the 62 Texas local health departments and the eight Texas Department of State Health Services Health Service Regions (HSRs)
    - HSRs serve as the local health department in areas of the state without a local health department (equating to 190 of Texas' 254 counties) and have no vector control resources
Mosquito Surveillance and Control Infrastructure

• Mosquito surveillance and/or control activities are local responsibilities and may be conducted by
  – Environmental health agencies
  – Local health departments
  – County precincts, public works departments, etc.

Mosquito Testing

• Conducted at DSHS laboratory, certain local health department, and private laboratories
  – Identify mosquitos by species
  – Test for medically-important arboviruses in vector species
• Various data sets are not centrally compiled at DSHS
  – Comprehensive, statewide data difficult to obtain
**DSHS Arbovirus Laboratory Testing**

- Year round mosquito identification
- Cell culture for broad based surveillance
  - Detects a wider variety of arboviruses
  - Should show cytopathic effect from Zika virus
- PCR testing or mosquitoes for Zika virus is conducted on submissions from high-risk areas of South Texas
  - All negative as of 10/7/2016

**State Role in Mosquito Control**

- Texas Department of Agriculture
  - Regulate pesticide applicators
- DSHS
  - Provide mosquito speciation and testing
  - Provide consultation and guidance (Medical Entomologist)
  - Administer CDC grant awarded to Harris County (included Houston) for arbovirus activities
  - Activate contracts to support activities at the local level when justified and as funding is available
Microcephaly

Zika and Pregnancy

- Infection can occur in any trimester.
- Zika is among the causes of microcephaly and other birth defects.
- Risks of infection difficult to define
  - The timing of infection may have differing impact on the pregnancy.
  - Not all pregnant women who are infected with Zika have adverse birth outcomes.
  - Percent of infants born with microcephaly to a woman infected with Zika during the first trimester of pregnancy is estimated to be between 1% and 13%.
**DSHS Birth Defects Epidemiology and Surveillance Branch Activities**

- Analyzed historical microcephaly data for Texas to get baseline information
  - Rate for Texas has increased since 1999 – likely due to changes in health care/clinical practice and increased diagnosis
- Conducts “rapid ascertainment,” which means the condition will be evaluated early and closely monitored going forward for Zika virus and other causes
- Initiated a “real-time” targeted birth defects surveillance pilot project in Houston and San Antonio
  - Collaboration with specific specialists (maternal fetal medicine and neonatology) to identify within the week of delivery, babies with both Zika and birth defects

**U.S. Zika Pregnancy Registry**

- Purpose – Characterize the full range of outcomes of asymptomatic and symptomatic Zika virus infection…includes possible infection
- Actively monitor pregnancies and congenital outcomes (mother, neonate, infant)
- CDC releasing only national data weekly
- Counted symptomatic AND asymptomatic pregnant women
  - Who have Zika disease, OR
  - Zika infection without disease, OR
  - Who have an undifferentiated flavivirus infection
### U.S. Zika Pregnancy Registry

- **DSHS Participation**
  - Analysis of statutory constraints on data sharing is underway
  - ZCB provides all investigation-related data to the USZPR
- **Local Health Department Participation**
  - Degree of participation will vary
  - Survey results under review

### Additional resources

- DSHS Zika information: [http://www.texaszika.org](http://www.texaszika.org)
- DSHS zoonosis information: [http://www.texaszoonosis.org](http://www.texaszoonosis.org)
QUESTIONS?