Zika Virus and Arbovirus Surveillance and Control in Maryland

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VMCA-MAMCA Joint Annual Meeting 2017
January 31, 2017
CZVBD: Who Are We?

- Maryland Department of Health & Mental Hygiene (DHMH)
- Prevention and Health Promotion Administration (PHPA)
- Infectious Disease Epidemiology and Outbreak Response Bureau
- Center for Zoonotic and Vector-borne Diseases (CZVBD)
Mission –
To reduce the incidence and associated impact of rabies and other zoonotic and vector-borne diseases in Maryland
CZVBD Program Areas and Activities

• Main Program Areas
  – Rabies – animal and human
  – Lyme and other tick-borne diseases
  – West Nile virus and other arboviruses, Zika virus
  – Other zoonoses (zoonotic influenza, psittacosis, etc.)

• Activities
  – Zoonotic disease surveillance and investigation
  – Technical support, guidance, and consultation
  – Collaborations with federal, state, and local partners
  – Special initiatives: Zoonotic Disease Update, Mid-Atlantic Zoonotic and Vectorborne Disease Interagency Group
Zika Virus
What is Zika virus?

• Single-stranded, enveloped RNA virus
• In the *Flaviviridae* family
  – Yellow fever
  – West Nile
  – Dengue
  – St. Louis encephalitis

A transmission electron micrograph of the Zika virus (CDC)
Incubation period unclear (likely days to 2 weeks)
Most infections (~80%) are asymptomatic
Common symptoms: fever, rash, joint pain, conjunctivitis
Transmission via mosquito bites, mother to child, sex, blood transfusion, lab exposure, blood and body fluids
Mosquito borne transmission in the Americas, Asia and Pacific Islands, and Africa
Zika Cases Reported in the United States

Laboratory-confirmed Zika virus disease cases reported to ArboNET by state or territory (as of Jan 25, 2017)

Source: CDC, as of January 25, 2017

Regional Reporting of Zika Cases (n=161 as of January 25, 2017)

Confirmed Zika cases as of January 25, 2017
Threat to Maryland

- Local mosquito-borne Zika virus transmission has been reported in two areas of Miami, FL and in Brownsville, TX.

- Local mosquito-borne transmission of Zika virus has also been reported in three US territories.

- Zika virus outbreaks are occurring in multiple countries.
Threat to Maryland

• Many travel-associated Zika cases identified in the U.S. and will continue to increase

• Many infections will not be diagnosed but could potentially serve as source for transmission

• Travel-associated cases could result in local spread of the virus in the U.S., including in Maryland
Maryland Public Health Response

- Providing Zika information to Marylanders in a variety of formats (including website and social media)
- Providing guidance to MD healthcare providers
- Working with providers for Zika testing at DHMH (with focus on pregnant women)
- Coordinating medical management for Zika-infected pregnant women and infants
Maryland Public Health Response

• Conducting surveillance and epidemiologic investigations
  – Zika infection (reportable)
  – Microcephaly (reportable, including by hospitals)
  – Guillain Barre Syndrome
  – Mosquito

• Controlling mosquitoes (in collaboration with Maryland Department of Agriculture)
Maryland Zika Activities

• Zika Awareness Week (April 24-30, 2016)
  – Governor proclamations to all LHDs
  – LHDs asked to host/sponsor Zika-related activities

• Zika Prevention Kits for pregnant women
  – Educational information
  – Repellent
  – Larvicide
  – Condoms
Vector Control for Zika ≠
Vector Control for West Nile Virus

• Mosquito-based surveillance is the preferred method for monitoring or predicting WNV outbreaks

• Not the preferred method for monitoring or predicting Zika (or dengue, chikungunya, or yellow fever) outbreaks

• For these arboviruses, it is more efficient to detect cases in people
Aedes Surveillance and Control

• Surveillance
  – Determine presence or absence of Aedes
  – Identify types of containers producing the most mosquitoes for targeting vector control efforts
  – Understand where mosquito populations occur
  – Monitor the effectiveness of vector control efforts
Aedes Surveillance and Control

• Control
  – Community and property clean up
  – Application of larvicide
  – Application of adulticide
  – Education about personal protection
Public Outreach: Personal Protection Materials
Focused Activities When Any of the Following Occurs

• Any detection of *Ae. aegypti*;

• An abundance of *Ae. albopictus* detected; OR

• Cases of travel-associated Zika virus infection are detected
Legal Authorities for Mosquito Control

• MDA Mosquito Control Program has existed since July, 1956 See Md. Code Ann., Agriculture. §§ 5-401 through 5-408, DHMH to prevent spread of infectious diseases:
  – See Md. Code Ann., Health-Gen. §§ 2-104, 18-102(b), 18-103(a), and 18-107

• Required reporting:
  – See Md. Code Ann., Health-Gen. §§ 18-201, 202, and 205 and COMAR 10.06.01.03

• Provisions for catastrophic health emergencies, nuisance control and abatement, public health emergencies and declarations
When Travel-associated Cases of Zika Virus Infection are Detected

• Determine if patient was potentially viremic while in Maryland (DHMH)

• Assess presence of *Aedes* sp. mosquitoes within 150 meters of patient’s residence (MDA and certain LHDs)
Detection of a Potentially Viremic, Travel-associated Case of Zika Virus Infection

• Public education about community source reduction (elimination of breeding sites)
• Measures to minimize contact between arboviral vectors and viremic patients
• Mosquito control to reduce vector abundance, including:
  – ULV knockdown
  – door-to-door inspections
  – larvicide and adulticide applications within 150 m around mosquito detection or patient’s home
Detection of a Potentially Viremic, Travel-associated Case of Zika Virus Infection

- Maintain adult sampling to estimate adult mosquito abundance and evaluate effectiveness of insecticide treatments
- Test any collected adult *Ae. aegypti* for Zika, dengue, and chikungunya viruses
Mosquito Responses in Maryland

- Human arboviral disease surveillance season July 1 - October 31 each year
- End of “mosquito season” (active biological activity) is “first hard frost”
- Total mosquito responses in 2016: 84
West Nile Virus
Cumulative Numbers of Mosquitoes Tested for Arboviruses in MD by MMWR Week, 2016
Human West Nile Virus Cases, Maryland, 1999-2016
## Maryland WNV Results Summary 2007-2016

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QUESTIONS?