CHANGING Maryland *for the Better*

Zika Virus and Arbovirus Surveillance and Control in Maryland

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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)

Center for Zoonotic & Vector-borne Diseases

Mission –

To reduce the incidence and associated impact of rabies and other zoonotic and vector-borne diseases in Maryland

CZVBD Program Areas and Activities

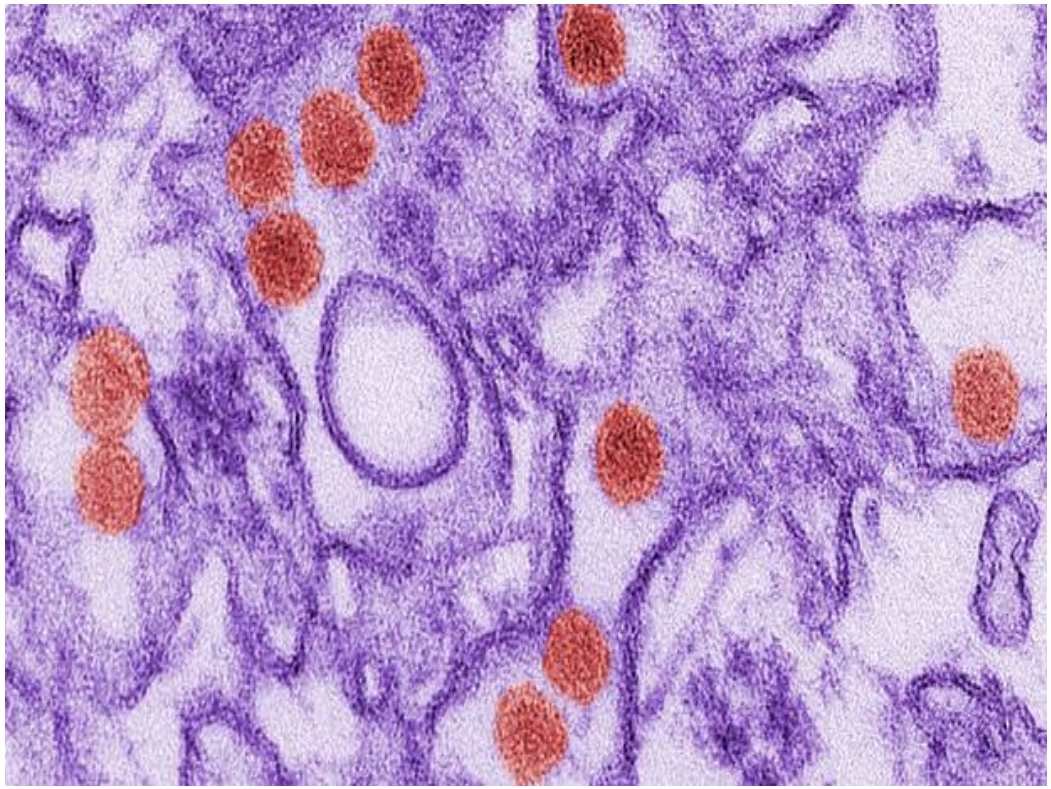
- Main Program Areas
  - Rabies – animal and human
  - Lyme and other tick-borne diseases
  - West Nile virus and other arboviruses, Zika virus
  - Other zoonoses (zoonotic influenza, psittacosis, etc.)

- 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



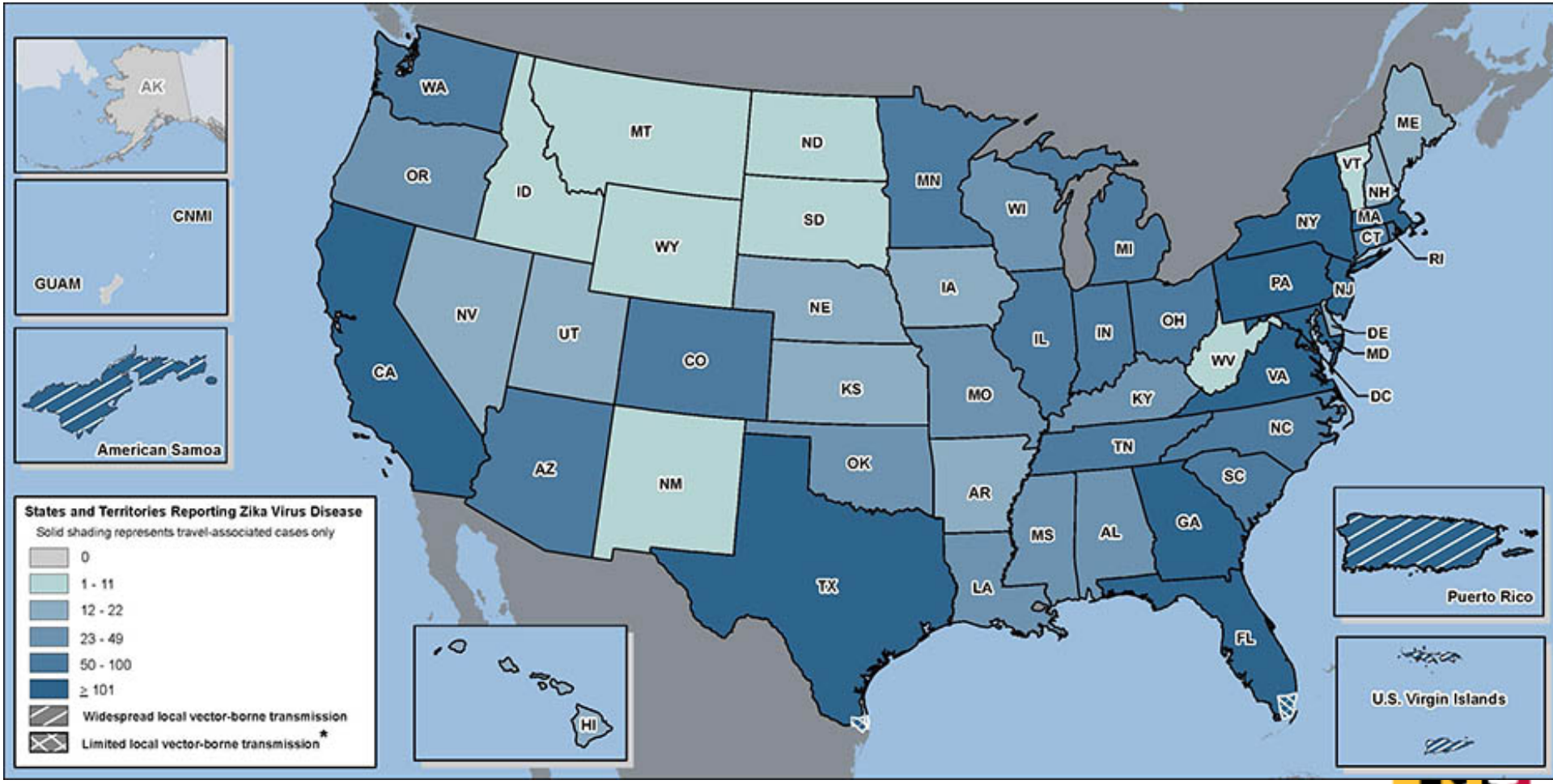
A transmission electron micrograph of the Zika virus (CDC)

Incubation, Transmission, and Geographic Range

- 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

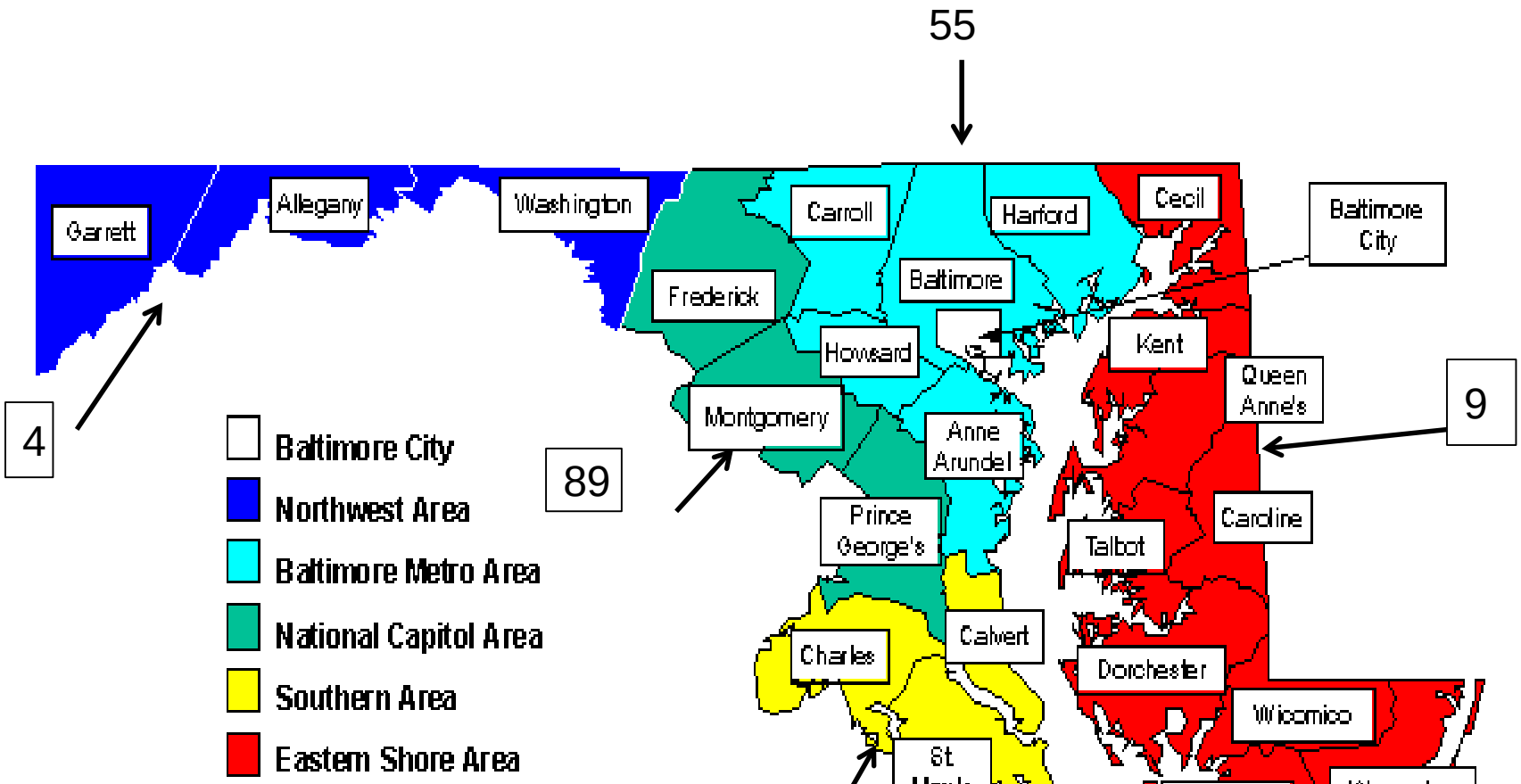
Laboratory-confirmed Zika virus disease cases reported to ArboNET by state or territory (as of Jan 25, 2017)



Source: CDC, as of January 25, 2017

From: https://www.cdc.gov/zika/intheus/maps-zika-us.html

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

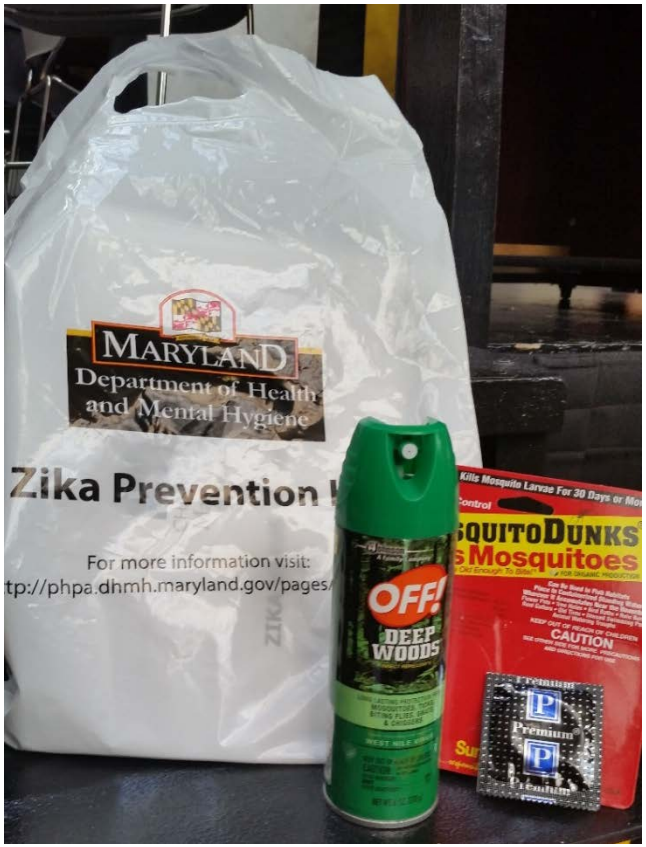
- Providing Zika information to Marylanders in a variety of formats (including website and social media)
- Providing guidance to MD healthcare providers
- Working with providers for Zika testing at DHMH (with focus on pregnant women)
- Coordinating medical management for Zika-infected pregnant women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

Interim MD *Aedes* Surveillance and Control Plan

Interim Maryland *Aedes* Surveillance and Control Plan

September 23, 2016

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

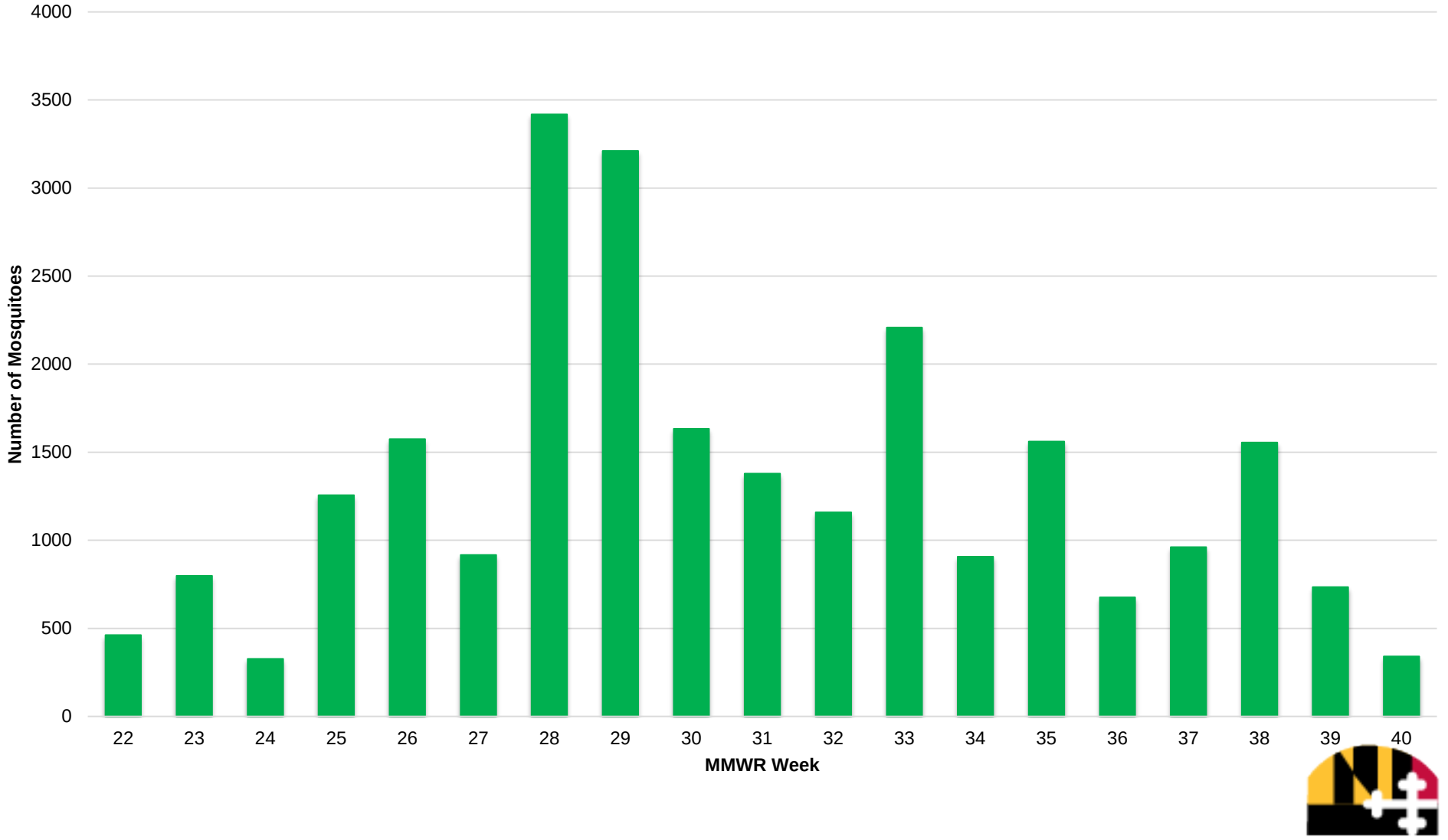
- Maintain adult sampling to estimate adult mosquito abundance and evaluate effectiveness of insecticide treatments
- Test any collected adult *Ae. aegypti* for Zika, dengue, and chikungunya viruses

Mosquito Responses in Maryland

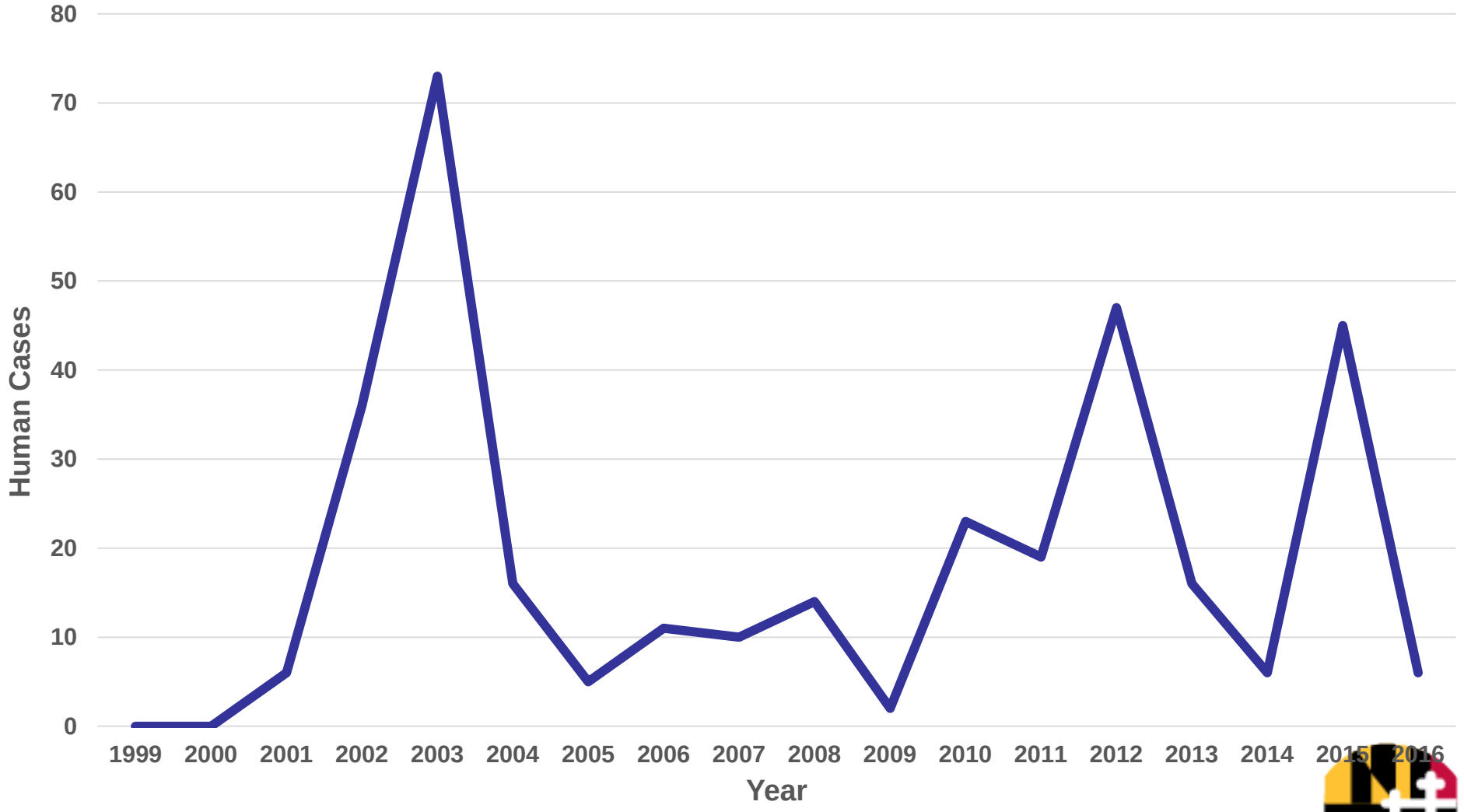
- Human arboviral disease surveillance season July 1 - October 31 each year
- End of “mosquito season” (active biological activity) is “first hard frost”
- Total mosquito responses in 2016: 84

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

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Mosquito Pools	6	23	9	8	20	11	10	33	33	6
Avian	0	0	0	0	7	0	0	0	4	1
Equine	0	2	1	1	2	3	1	2	2	0
Camelid	0	0	0	0	0	0	1	0	0	0
Human	10	14	1	23	19	47	16	6	46	6

QUESTIONS?