Office of Pesticide Programs Presentation at PPDC May 2017

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Discussion Topics

- ✓ Zika Update
- ✓ Status of Registration Reviews
- ✓ Integrated Pest Management
- ✓ Public Health Workgroup
- ✓ Discussion

First time in history…

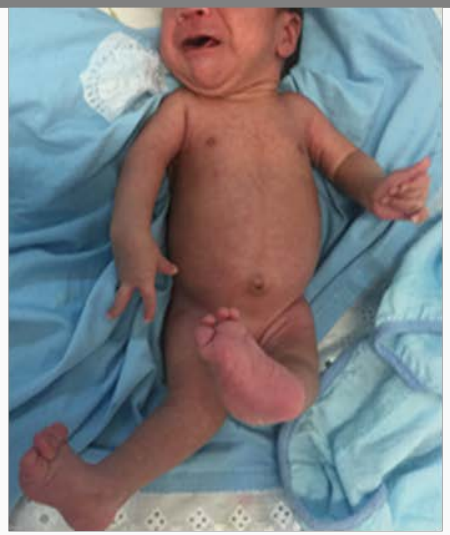
"Never before in history has there been a situation where a bite from a mosquito could result in a devastating malformation."

– Dr. Tom Frieden, former CDC Director
Fortune, April 13, 2016

"…the last time an infectious pathogen (rubella virus) caused an epidemic of congenital defects was more than 50 years ago…"

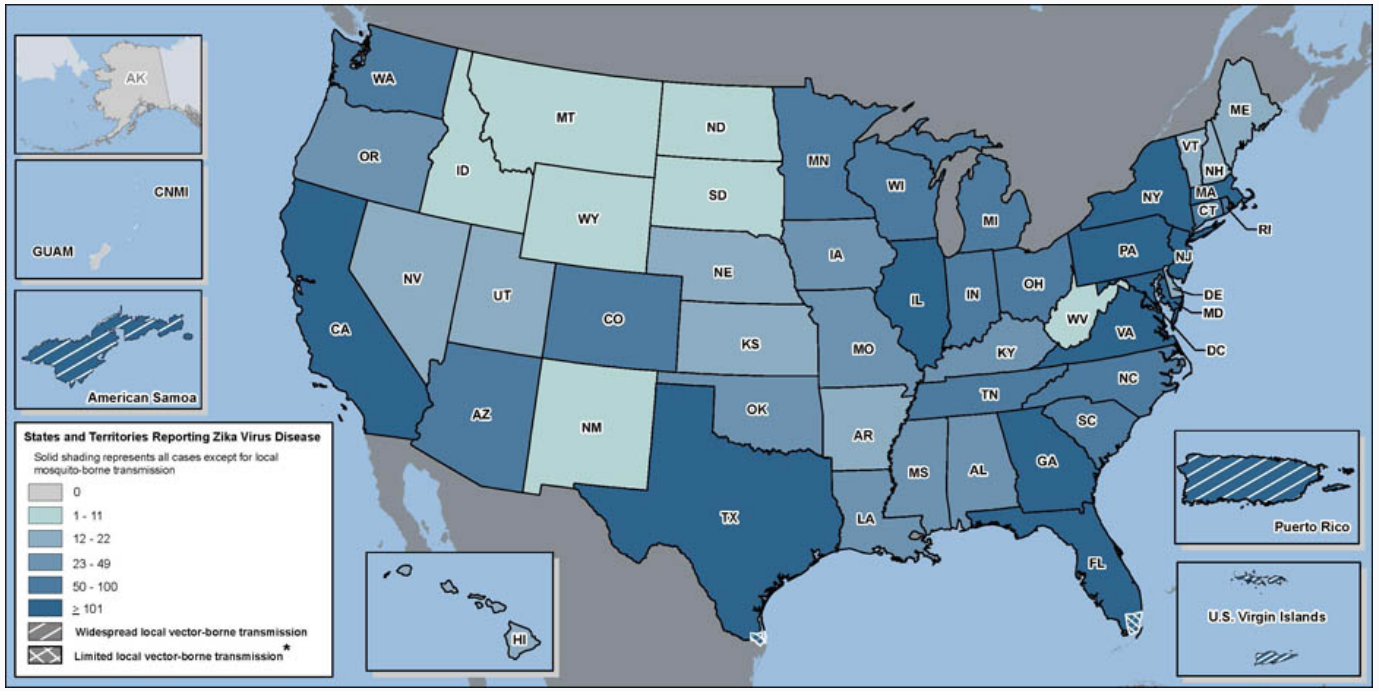
– *New England Journal of Medicine*, April 13, 2016

Borrowed from CDC



Borrowed from CDC

Zika Cases, United States, as of April 12, 2017



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

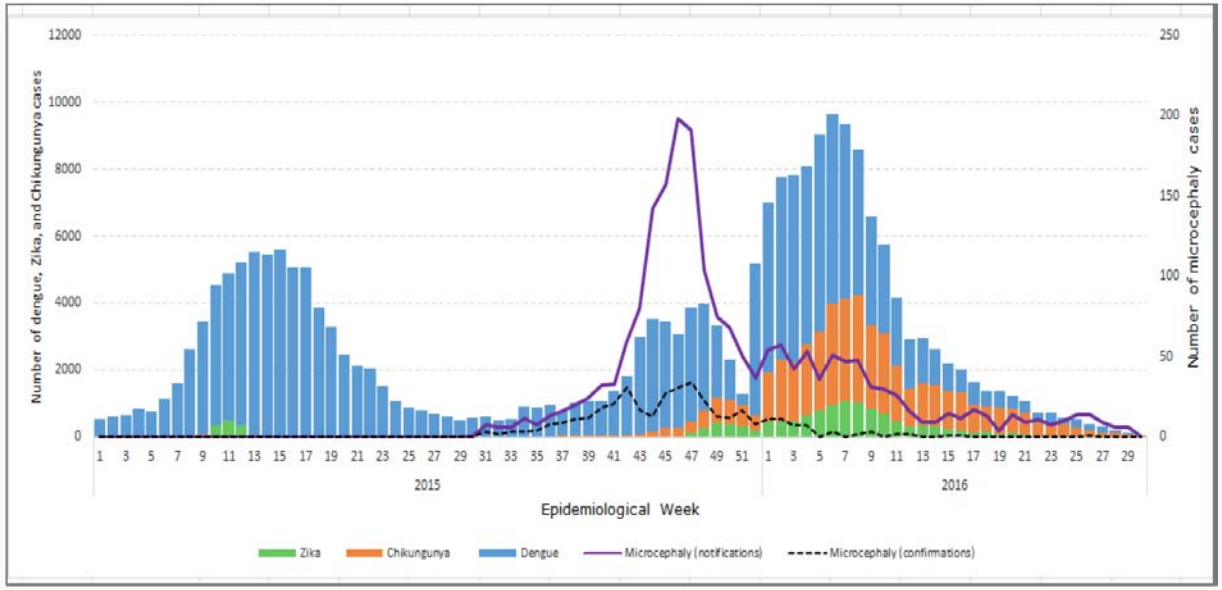
Zika Statistics

- Zika Virus Cases Officially Reported (4/12/17)
  - –US States and DC: 5,234
  - –US Territories: 36,526
- Pregnancies Officially reported
  - –US States and DC: 1,716
  - –US Territories: 3,461
- Pregnancy Outcomes in the US States and DC:
  - –1311 completed, 56 live born with Zika related defects
  - –7 pregnancy losses with Zika related defects

Zika Virus Arrives in the Americas

- **March 2015**: Asian genotype first identified in Americas in Brazil
- **Sept 2015**: Increased number of infants born with microcephaly noted in northeastern Brazil
- **Early 2016**: Increase in microcephaly noted retrospectively in French Polynesia

Reported cases of dengue, chikungunya, Zika virus and microcephaly in Pernambuco State,



Source: Pernambuco State Secretary of Health to PAHO
http://www.paho.org/hq/index.php?option=com_docman&task=doc_view&gid=35221&Itemid=270&lang=en

Borrowed from CDC

What is Zika Virus?

- Single-stranded RNA virus
- Closely related to dengue, yellow fever, Japanese encephalitis, and West Nile viruses
- Primarily transmitted by *Aedes aegypti* and occasionally by *Aedes albopictus* mosquitoes
- Additional modes of transmission
  - Intrauterine and perinatal transmission
  - Sexual transmission
  - Laboratory exposure
  - Blood transfusion

***Aedes aegypti* mosquito**

***Aedes albopictus* mosquito**

Borrowed from CDC

Congenital Zika Syndrome

- Congenital Zika syndrome is a recently recognized pattern of congenital anomalies associated with Zika virus infection during pregnancy that includes:
  - Severe microcephaly with partially collapsed skull.
  - Decreased brain tissue with a specific pattern of brain damage.
  - Damage to the back of the eye.
  - Joints with limited range of motion.
  - Too much muscle tone restricting body movement soon after birth.

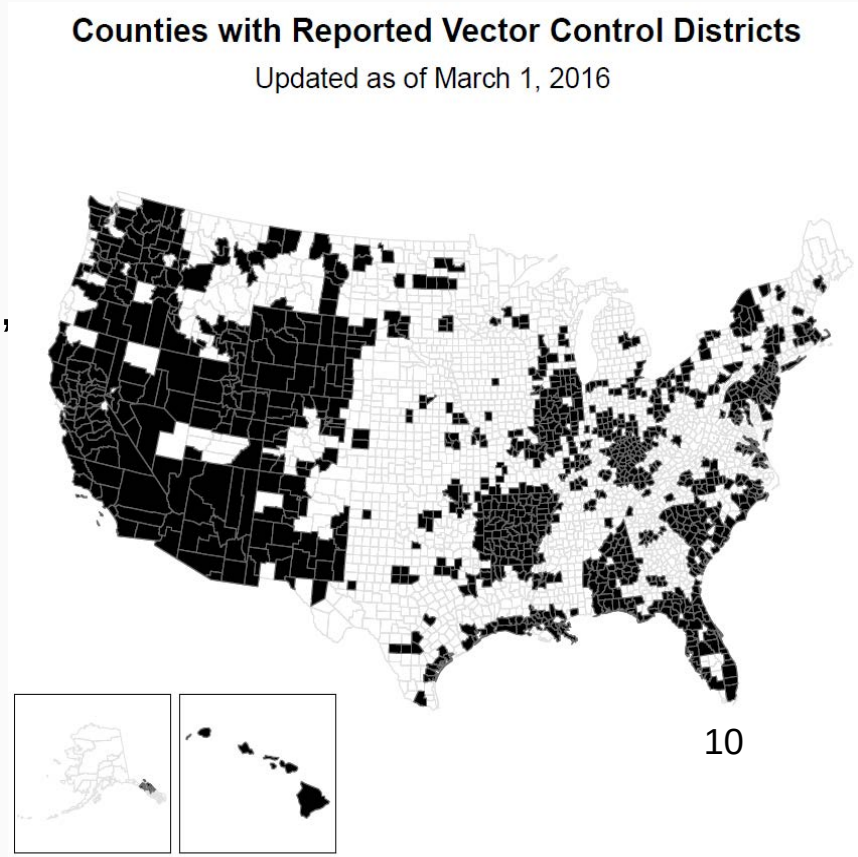
Borrowed from CDC

EPA's Role

- Support CDC by providing expertise in integrated pest management and pesticide registration and use.
- Provide expertise to other federal agencies (DoD, HUD, etc).
- Primary source for pesticide information and communication with the public, press, and Congress.
- Coordinate with states to provide support in areas that need additional assistance / expertise to control mosquitoes.
- Collaborate with key stakeholders, share information.
- Work with pesticide registrants, as needed/appropriate.

Mosquito Control Is Key to Zika Prevention

- Comprehensive, sustained efforts needed
  - Control larvae and adults
  - Surveillance
  - Enhanced personal protection
- Mosquito control is a patchwork
- New tools (biocontrol, traps, insecticides, and new approaches



Borrowed from CDC

Vaccine Development

Good news on the Zika Vaccine Front:

- –Moving forward on trials
- –Use of live attenuated vaccine
- –Antibody response is strong
- –No human safety concerns
- –Inability of mosquitos to spread based on vaccine

http://acsh.org/news/2017/04/11/mosquito-season-ramps-so-does-progress-zika-vaccine-11115

Improved Methods for Controlling of Aedes aegypti

The toolbox of mosquito control options

Personal protective measures	Physical control measures	Larval control measures	Adult control measures - biological	Adult control measures – chemical/mechanical
Personal Repellent	Screens	Biological – Copepods/fish	Sterile insect technique (SIT)	Lethal ovitraps – AGO traps
Protective clothing	Air conditioning	Biological – Bti, some oils	Genetically modified mosquito (**Oxitec, etc.)	Fogging
Bed nets*	Source reduction – standing water	Chemicals	**Wolbachia (SIT or transmission-blocking)	Residual sprays
Indoor spatial repellent		Chemical – Growth regulators	Fungal agent	
		In2Care traps (growth regulator and fungal)		

Borrowed from CDC

*When screens and air conditioning are not available
**Oxitech and Wolbachia are in experimental phase and not yet approved by EPA or FDA

Registration Review Schedule for Mosquito Control Pesticides

- **Pyriproxifen:** EFED and HED assessments planned for Summer 2017
- **Spinosad:** EFED and HED assessments complete, Preliminary Interim Decision planned for Summer 2017
- **Malathion:** EFED and HED complete, Preliminary Interim Decision planned for 2018
- **Naled:** EFED and HED assessment planned for 2017
- **Chlorpyrifos:** HED Assessment out in November 2016
- **Etofenprox:** EFED assessment complete, HED assessment planned for Summer 2017, Preliminary Interim Decision planned for 2018

Registration Review Schedule for Mosquito Control Pesticides

- **Phenothrin (Sumithrin):** EFED and HED assessments complete, preliminary Interim Decision planned for 2018
- **Prallethrin:** EFED and HED complete, preliminary Interim Decision planned for 2018
- **Deltamethrin:** EFED assessment complete, HED assessment planned for Summer 2017, Preliminary Interim Decision planned for 2018
- **Pyrethrins**: EFED assessment complete, HED assessment planned for Summer 2017, Preliminary Interim Decision planned for 2018
- **Permethrin:** EFED assessment complete, HED assessment planned for Summer 2017, Preliminary Interim Decision planned for 2018

Public Participation

- **For registration review, public input is particularly valuable**
  - Label and use patterns will drive risk assessments
    - More detailed use and usage information could refine assessments and ensure more accurate assessments
  - Risk assessment, when geographic locations of use may refine ecological assessments or endangered species assessments
  - Risk mitigation development
  - Risk/Benefits decision, to articulate benefits if EPA needs to make risk/benefits determination

Suppressing Mosquitoes: Bacteria and Biotech

- Release males only – they don’t bite
- Offspring do not develop into adulthood
- Species specific
- Gets at mosquitoes in places chemicals cannot
- Reduces mosquito population

Integrated Pest Management

- Vector-borne diseases: globally, 17% of all infectious diseases; cause more than 1 million deaths worldwide annually

- The US reports an average of 40,328 vector-borne disease cases per year

- Vector-borne diseases of primary concern in the U.S.
  - Arboviral diseases (Zika, West Nile, Eastern equine encephalitis, Saint Louis encephalitis, dengue, etc.)
  - Malaria
  - Tick-borne diseases (Lyme borreliosis, spotted fever rickettsia, anaplasmosis/ehrlichiosis, babesiosis, etc.)

- Many vector-borne diseases are preventable through informed personal protective measures and the use of Integrated Vector Management

IPM Center of Expertise

- Shift to broader statutory role in IPM
- Prepare, coordinate, and rapidly respond
- Consultation to State and local agencies
- Technical assistance to EPA Regions and the public
- Communication/Outreach
- Coordinate and collaborate with other EPA programs
- Partner with other federal agencies

IPM Partnership Opportunities

- **Centers for Disease Control (CDC)**
  - Establish 4 Vector Borne Disease Regional Centers to generate research, knowledge, and capacity on local public health action for vector-borne diseases.

- **EPA Role**
  - Pesticides and pest control technologies
  - IPM tactics
  - Public outreach

Proposed Public Health Workgroup

- Charge: Address issues involving pesticides that affect emerging pathogens

  Time Frame: 1-2 years

  - Advise PPDC
  - May impact regulatory, policy, programmatic, environmental, technical, or economic decisions
  - Discussions on Zika and other emerging pathogens
  - Respond to PPDC requests
  - Receive stakeholder concerns to forward to EPA

Discussion Questions

1. Does the PPDC agree with the formation of a public health workgroup?
2. Please provide feedback and ideas on the charge I propose.
3. What would be the benefits EPA could gain from the workgroup focusing on Zika as I have suggested?
4. What other areas of public health and emerging pathogens do you advise would be appropriate for the workgroup to undertake?
5. Do you have any additional suggestions for me to consider?