ZIKA Action Plan SUMMIT

CDC Atlanta, GA

Controlling and Responding to Mosquito-Borne Illness

State and Local Panel

Moderator:
Anne Schuchat, MD, RADM, USPHS
Principal Deputy Director
Centers for Disease Control and Prevention

Centers for Disease Control and Prevention

Mosquito-borne disease surveillance and response coordination, Florida

Carina Blackmore, DVM, PhD, ACVPM
Acting Director, Division of Disease Control and Health Protection
Deputy State Epidemiologist
Florida Department of Health

Background

- Florida State Board of Health was created as a result of yellow fever epidemic in 1889
- Malaria and dengue also common
- The first mosquito control district was formed in 1925
- Mosquito control helped enable growth of human settlements on the Florida peninsula
- Strong history of mosquito-borne disease research at Florida universities and public health laboratories

Mosquito-borne disease in Florida

- Endemic mosquito-borne diseases
  - St. Louis encephalitis
  - Eastern equine encephalitis
  - West Nile virus disease
- Periodic transmission of non-endemic mosquito-borne diseases
  - Malaria
  - Dengue fever
  - Chikungunya fever

Florida Interagency Arbovirus Taskforce

- Department of Health
- Department of Agriculture and Consumer Services
- Department of Environmental Protection
- Fish and Wildlife Conservation Commission
- Florida Mosquito Control Association
- Florida Environmental Health Association
- Florida Association of County Health Officers
- USDA
- Universities involved in mosquito-borne disease diagnostics or research

Surveillance and Control of Selected Mosquito-Borne Diseases in Florida

- Public health surveillance guidance
- Mosquito-borne Disease Response Plan
  - Mosquito-borne disease advisory/ alert/ emergency
- Communication plan
  - Drain and Cover
  - Press releases
  - Marketing materials

Strong mosquito control infrastructure helps with coordination and standardization

- Florida Coordinating Council on Mosquito Control
  - Advisory group on mosquito control policy
- Training for partners
  - Florida Mosquito Control Association
  - Florida Medical Entomology Laboratory
- Joint exercises

IMPACT

- Routine, standardized, science-based response
  - Mosquito surveillance and control in response to animal surveillance data and suspect human case reports
  - Coordinated active case surveillance when local case clusters are suspected
  - Shared messaging to public and press

IMPACT

- "Real-time" adjustments are made with the right partners at the table
  - Conference calls to discuss risk assessment and response needs based on surveillance findings
  - Improved response to other-than nuisance mosquitoes (e.g. *Anopheles, Aedes aegypti*)

Considerations for Enhanced Mosquito Control in NYC in Anticipation of Local Zika Transmission

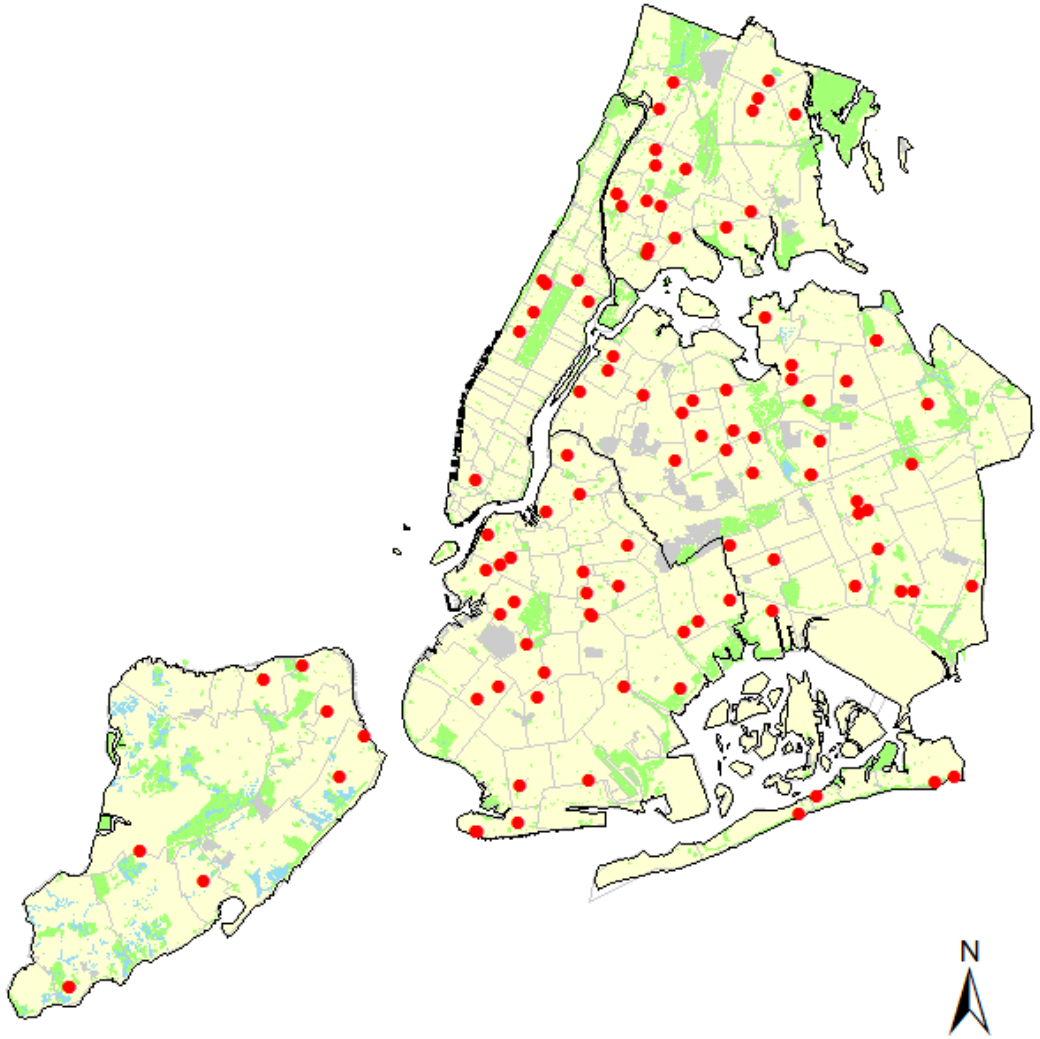
Daniel Kass
Deputy Commissioner, Environmental Health Services
New York City Department of Health & Mental Hygiene
New York, NY

Aedes Control Will Build on a Robust West Nile Virus Control Program

- Integrated Pest Management
  - Extensive Community Outreach
  - Mosquito Surveillance and WNV testing
  - Habitat Control and Standing Water Complaint Response
  - Ground and Aerial Larval Treatment of Natural Habitat, Built Environment
  - Human Surveillance
  - Truck-Based Ultra Low Volume Adulticide Application in Populated Areas and Natural Habitat

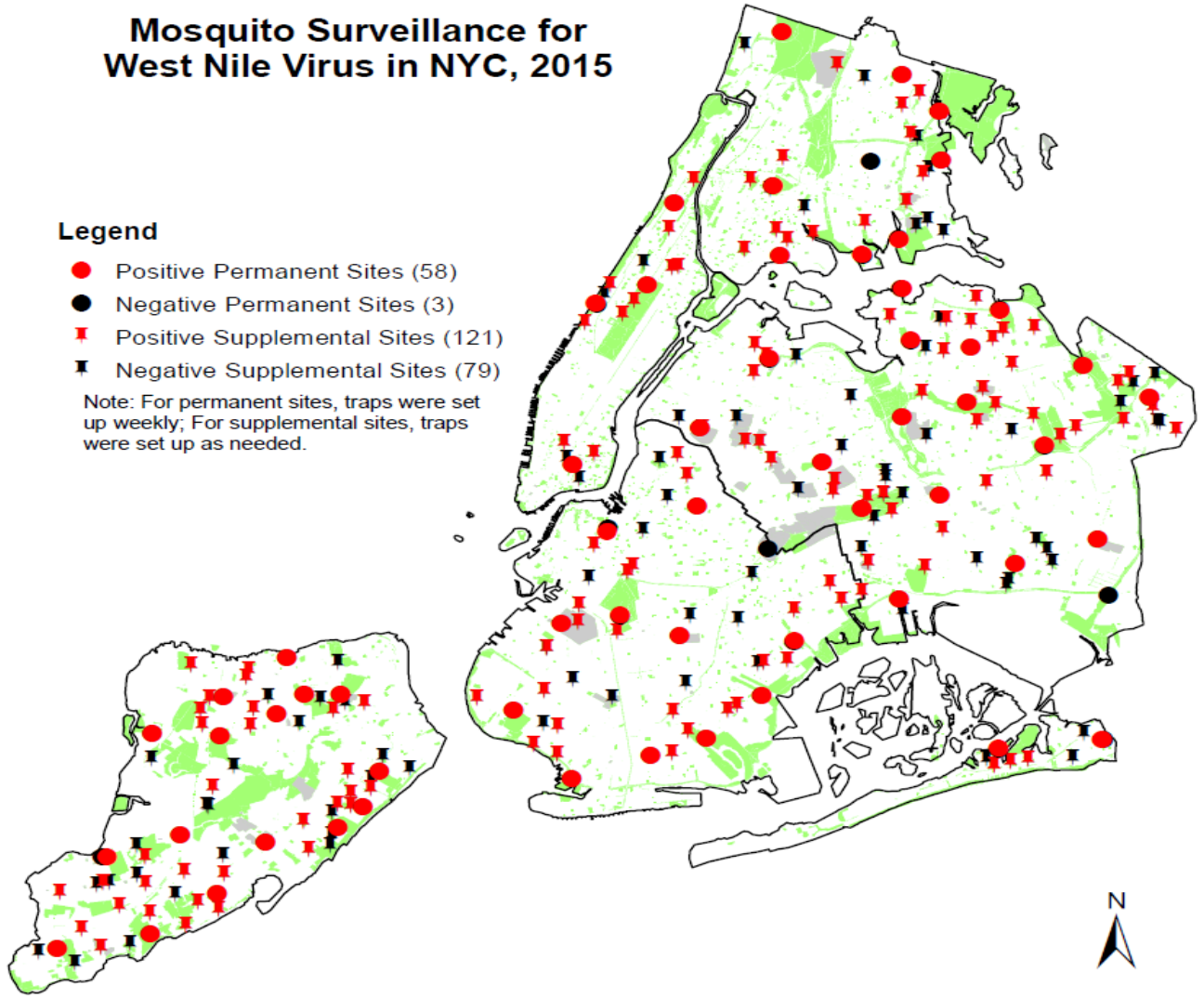
Public Outreach, 2015

- 105 Community, Senior Center WNV Presentations
- Other Community Outreach Activities
  - Distribution of flyers in WNV and mosquito hot-spots
  - Spray notification fliers in the spray zones
  - Distribution of 2,000 – 5,000 bottles of insect repellents to at risk communities



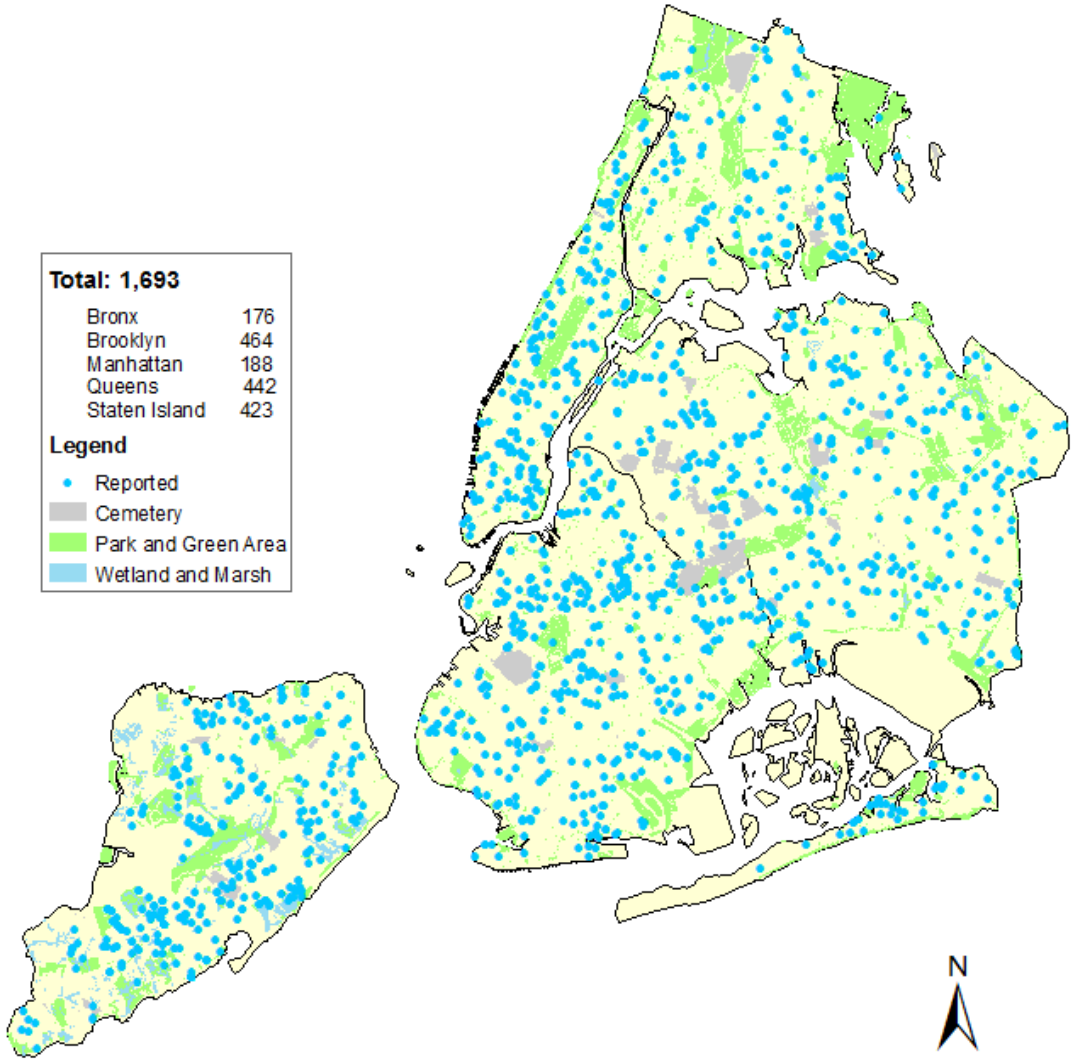
Mosquito Surveillance

- 61 Permanent Trap Sites
- 200 Supplemental Trap Sites
- Locations Optimized for Geographic Coverage + Historical WNV Positivity



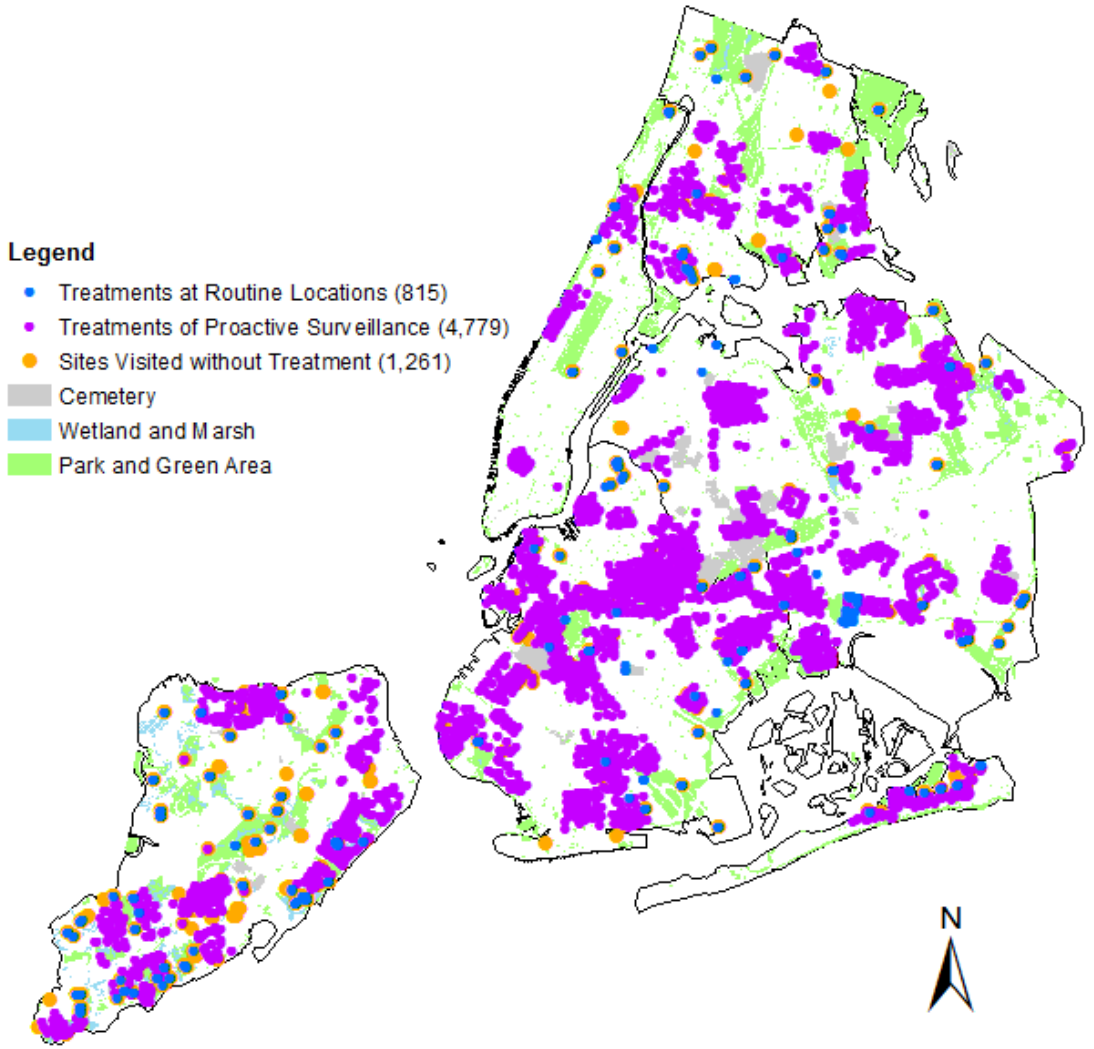
Standing Water Complaints, 2015

- ~1,700 standing water complaints via calls to 311
- ~1,500 resulting inspections
- Led to ~1,000 Applications of larvicide



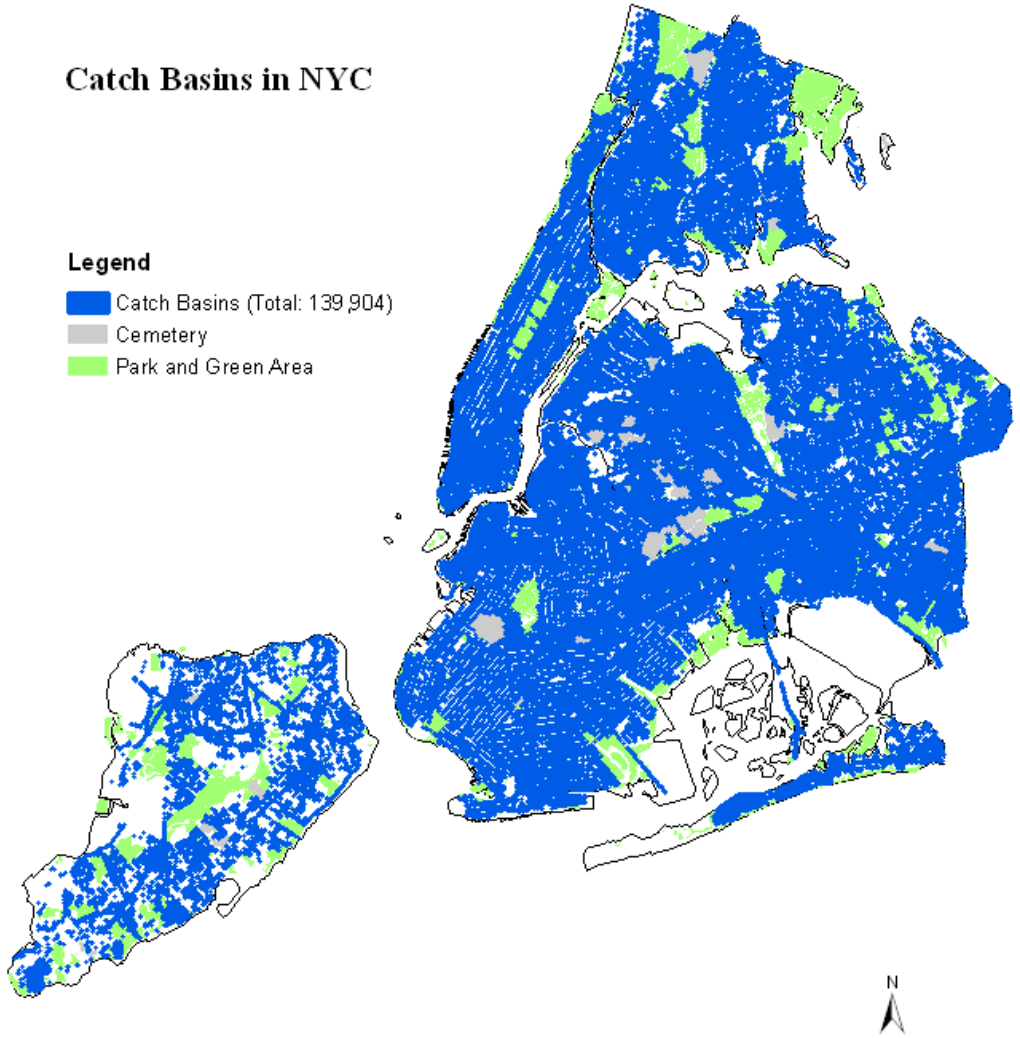
Ground Larviciding in NYC, 2015

- >800 treatments at routine locations
- ~4,800 treatments based on surveillance findings



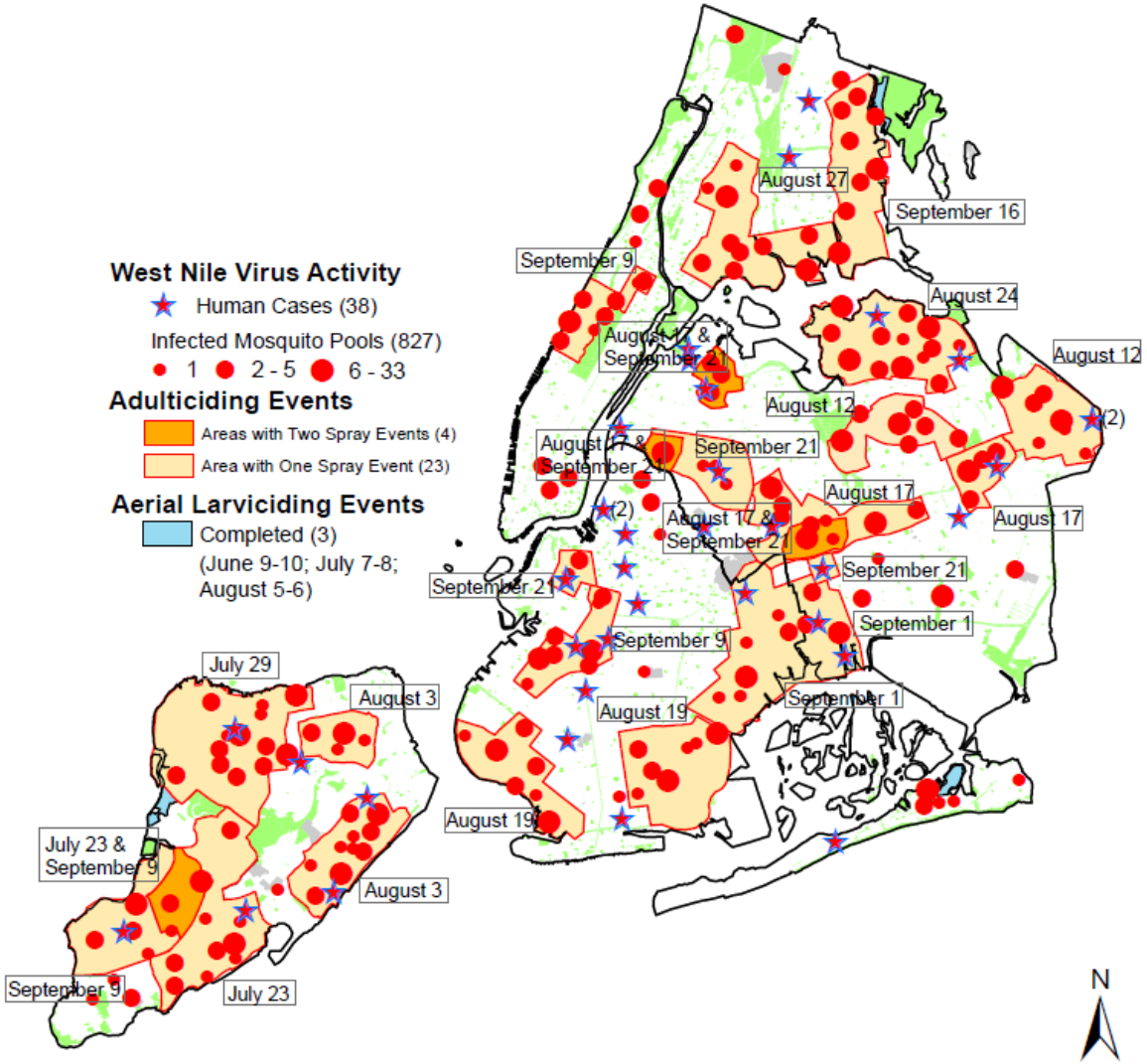
Catchbasin Larviciding in NYC, 2015

- 139,904 catch basins treated twice over 2015 mosquito season



Summary of West Nile Virus Activity, 2015

- 38 human cases
- 827 infected moquito pools
- 31 truck-based adulticiding events
- 3 aerial larviciding events



What We Learned in Early Years of WNV Response

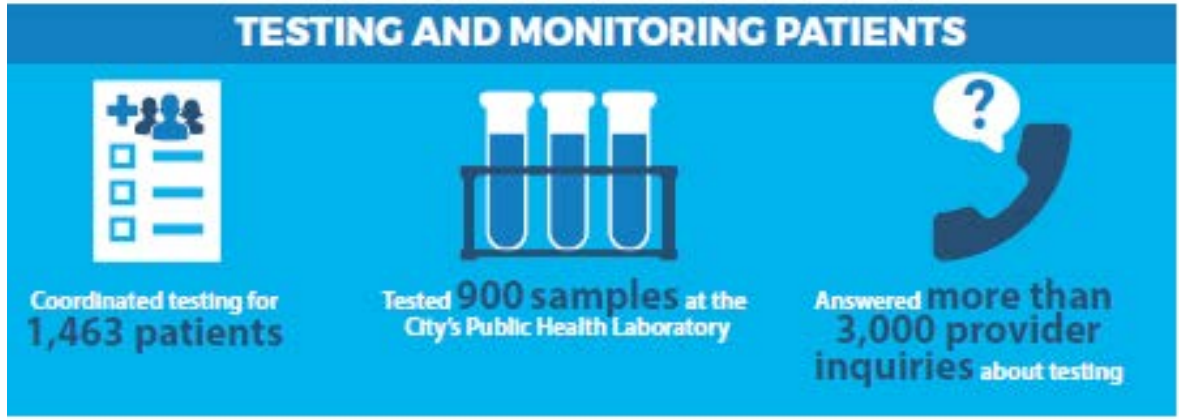
- Vocal public objection to aerial adulticiding, more acceptance of ground adulticiding when there is evidence of, and belief in threat of disease transmission.
- Direct local government (rather than contracted) provision of services results in improved outcomes, less conflict.
- High year-to-year variability in mosquito burden and locally transmitted disease means that surveillance and notification needs do not lessen year-to-year.
- Importance of emergency department and poison control surveillance that has verified absence of effects from pesticide use.
- Effective control requires public awareness and partnership on habitat control, direct community outreach for prevention and notification of spray events.

NYC's Zika Response To-Date

- Increase public awareness
- Educate providers and assist them with diagnosis
- Coordinate and perform laboratory testing
- Investigate suspect cases
- Monitor pregnant women with Zika infection and their babies
- Develop *Aedes* mosquito control plans

Health Department Zika Response

estimates as of March 15, 2016



Factors We Consider in Developing NYC's Local Mosquito Control Plans

- **Vector Presence and Competence**
  - NYC does not have *Aedes* aegypti mosquitoes, but has native widespread populations of *Aedes* albopictus and other *Aedes* mosquitoes.
  - Despite hundreds of annual cases of imported Dengue and Chikungunya cases among travelers, there has been no local transmission observed in NYC.
  - Local transmission of Zika not likely, but not out of the question.

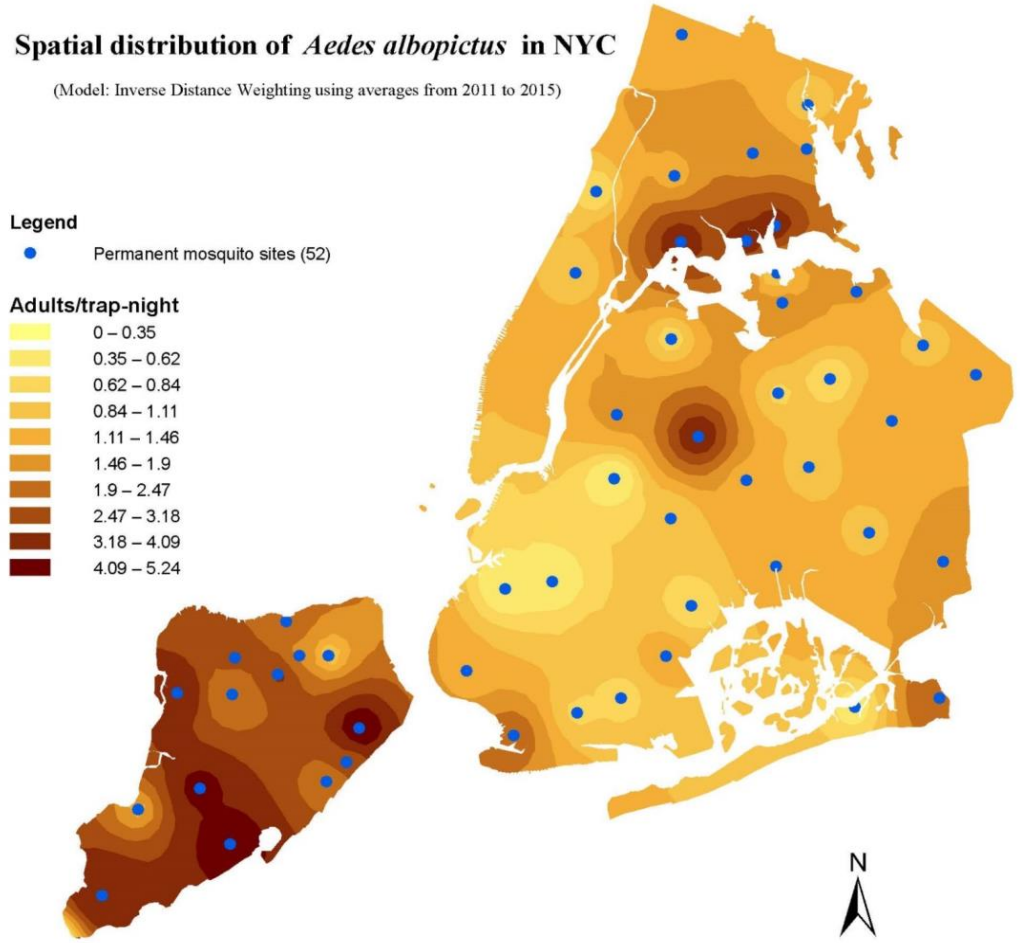
Factors We Consider in Developing NYC's Local Mosquito Control Plans

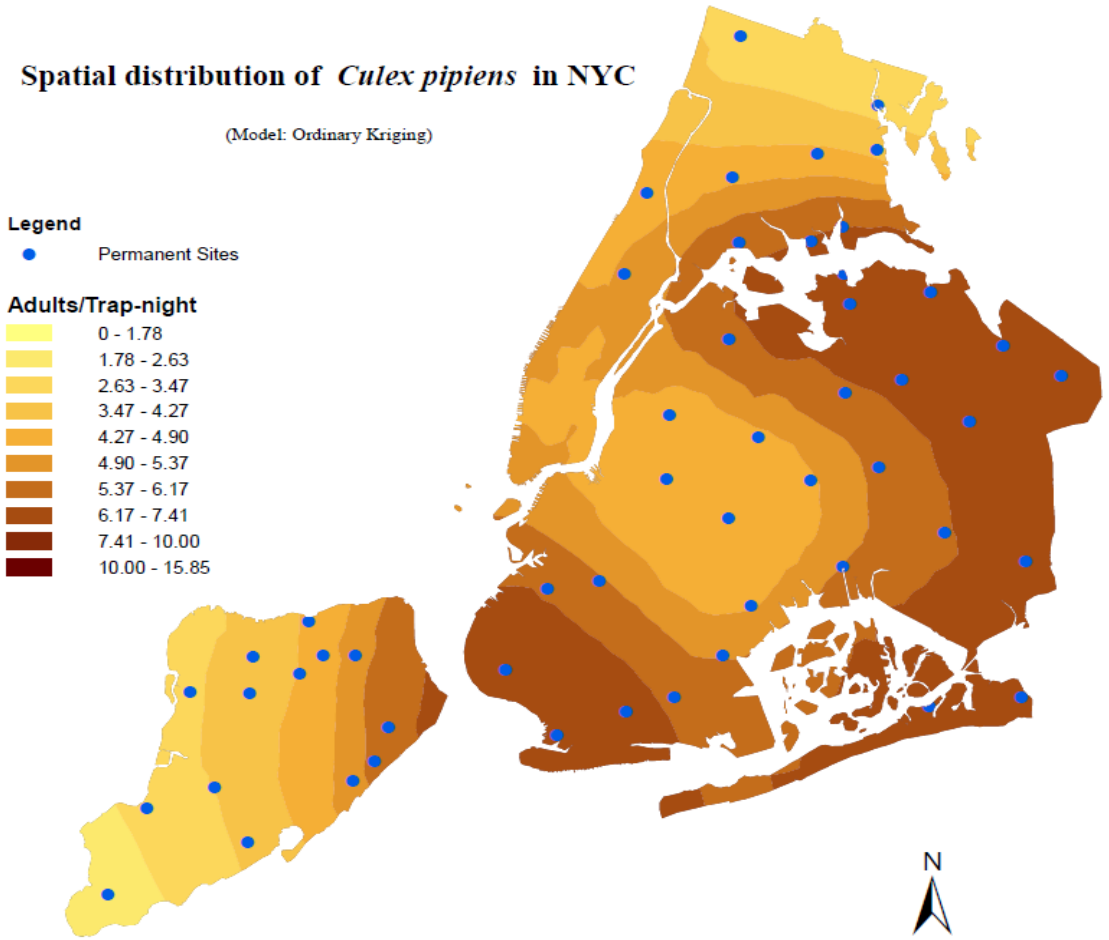
- **Public concern about Zika is greater than for West Nile virus**
- **Ability to rapidly detect local transmission is limited**
  - Most infections (up to 80%) are asymptomatic, suggesting that transmission to local host may occur without knowledge of the location of a viremic case in a human
  - Local transmission could occur without prior detection in mosquitoes.
  - Human testing is limited, driven by concerns about pregnancy and emergence of symptoms
  - Infectious period often passes prior to availability of test results

Factors We Consider in Developing NYC's Local Mosquito Control Plans

- **Features of *Aedes* mosquitoes**
  - Day-biters, distinct from *Culex*, suggesting daytime population considerations rather than residential for WNV control.
  - Requires different trapping protocols
  - Breed in smaller containers, demanding different standing water control and prevention
  - Geographic distribution distinct from *Aedes*, requiring treatment in novel neighborhoods

Differing Spatial Distribution of *Aedes* and *Culex*





Zika-Driven Changes Contemplated for Mosquito Control

- **Increased outreach and complaint response to control breeding conditions**
  - Increased geographic spread of community meetings
  - Increased distribution of repellent
  - Tracking ‘nuisance’ mosquito complaints to supplement trap surveillance
- **New Surveillance Traps for Asian Tiger mosquitoes:**
  - BG Traps®, Mosquito Magnets®, Ovitrap
  - Doubling of permanent trap sites
- **New Arsenal of Pesticides:**
  - Larvicides: Methoprene (Altosid®)
  - Adulticide: DUET™ Dual-action Adulticide (Sumithrin and Prallethrin)

Zika-Driven Changes Contemplated for Mosquito Control

- **New Pesticide Application Methods:**
  - Ground larviciding using truck-mounted applicators
  - Aerial larviciding in residential areas
  - Hand-held ULV adulticide spot treatment
- **Modified Decision-Logic for Pesticide Applications**
  - Temporal and frequency priority based on mosquito density, human behavior, and built environment characteristics, less so on viral-positivity. For example:
    - Daytime population, public gathering places, areas with history of travel-acquired flavi-virus diseases, areas with higher rates of travel to Zika-affected countries, lower prevalence of air conditioner use
- **Lower threshold overall for community-level response than for WNV**

Centers for Disease Control and Prevention

Responding to Zika: A Local Texas Public Health Perspective

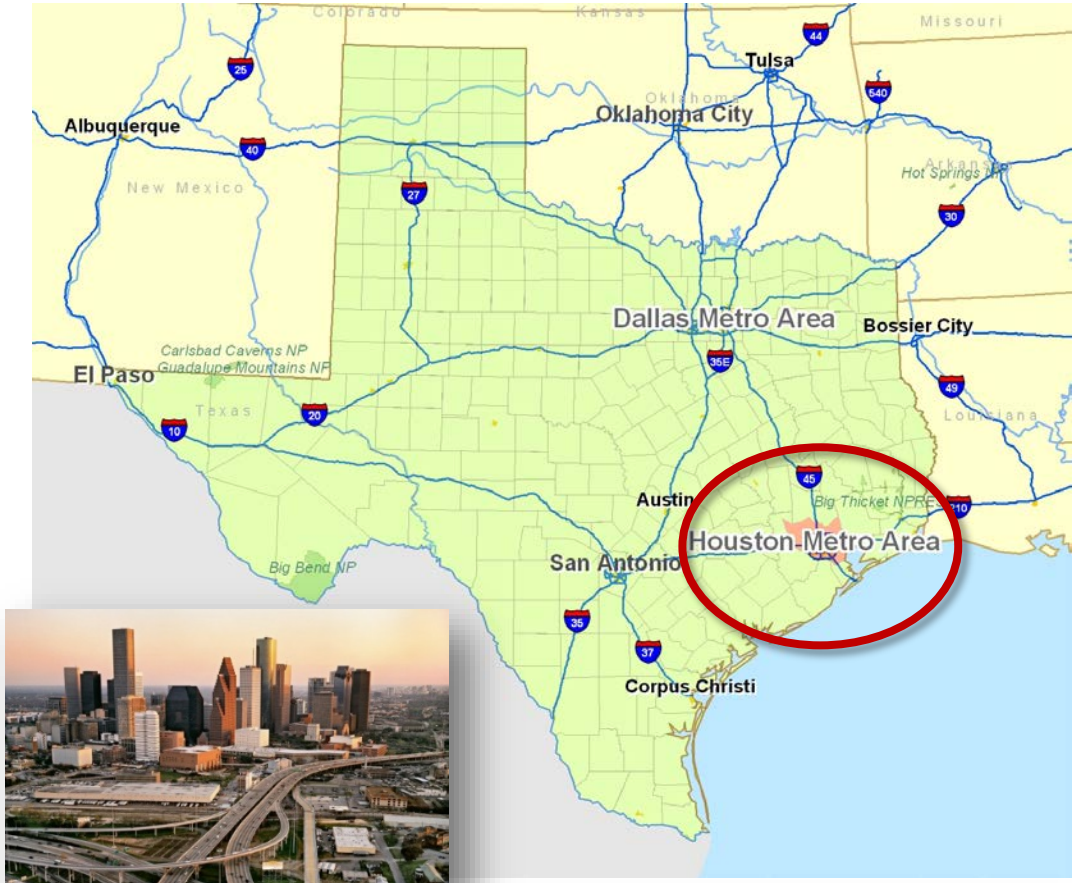
Umair A. Shah, M.D., M.P.H.

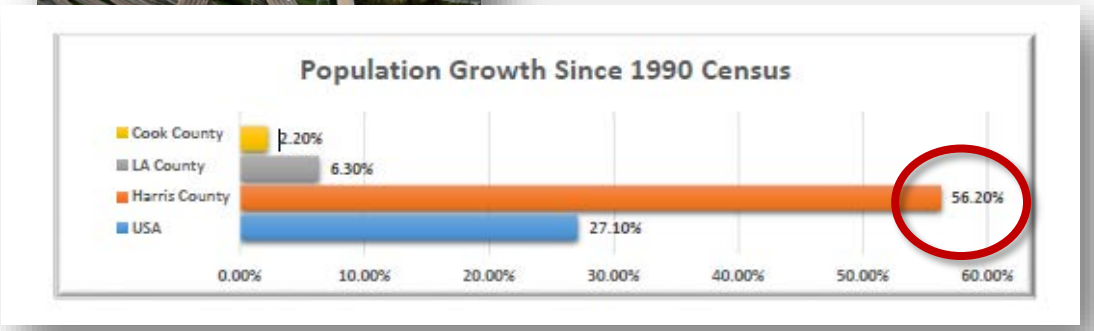
Executive Director

Harris County Public Health & Environmental Services (HCPHES)

HCPHES & Harris County

- HCPHES serves as the county health department for Harris County (TX) with over 700 public health professionals
- Third most populous county in nation with estimated population of 4.34 million
- Spread over 1,778 square miles *(larger than the state of Rhode Island)*
- Geographically, politically, and socio-demographically diverse and growing
- Home to world's largest medical center





History of Harris County Mosquito Control

Celebrating 50 Years of Mosquito Control in Harris County

1964

Vote to establish the Harris County Mosquito Control District.

PAGE 20, SECTION 1 THE HOUSTON POST THURSDAY, NOVEMBER 5, 1964

READY BY BUDGET TIME

Plans Afoot For Mosquito District

By ERNEST BAILEY

Two members of the Harris County Commissioners Court, County Judge Bill Elliott and Commissioner V. V. Ramsey, said Wednesday that a mosquito control district will be ready for operation when the county's 1965 budget is set in January.

Creation of the district was approved by a heavy majority of voters Tuesday.

A RELATED ballot authorizing county officials to levy a tax of up to 5 cents for each $100 of assessed valuations to support the district was approved by a thinner majority.

The tax fund will be taken from within the 80-cent constitutional tax limit for general county operations and will not cause an increase in the overall tax rate.

Judge Elliott said the county will have in practice "definite economies" in next year's operating expenses to provide the estimated $500,000 to $1 million a year cost of the mosquito control district.

"THE COURT will meet shortly to discuss what action can be taken before the new budget is drawn," Elliott said.

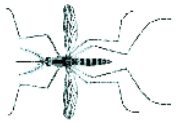
"I expect the court will hire an engineer for the control district, as the law provides, who is a qualified entomologist.

"We can have experts tell us before January what we will need to do about setting up a mosquito control district here, and tell us how much it is likely to cost."

JUDGE ELLIOTT said the

1979

First occurrence of *Aedes grossbecki* found in Texas and identified in Harris County.



1980

Placement of CDC light traps into storm sewer system.

1985

First discovery and identification of **Asian Tiger** (*Aedes albopictus*) mosquito in the continental United States.

&

First mosquito control agency in the United States to establish an in-house Virology Lab.

1990s

Establishment of Education and Outreach team to do community based prevention education and establishment of the Mosquito Control Regional Workshop to educate professionals on mosquito control techniques and methods.

1995

Harris County HCPHES Public Health & Environmental Services www.hcphes.org

Mosquito Control becomes a division of Harris County Public Health & Environmental Services.

2001

Comprehensive response to rise in mosquito population due to tropical storm Allison.

2002

Detection and Isolation of **West Nile virus** in birds and mosquitoes.

& Establishment of aerial contract for emergency events and in anticipation of West Nile virus.

Expansion of weekly Mosquito Surveillance to ensure comprehensive mosquito surveillance for all of 268 operational areas.

2005

& Establishment of a continually supported Mosquito Resistance Monitoring and Management Program.

2008

Comprehensive emergency response in the aftermath of Hurricane Ike, including aerial application of Dibrom to **more than 1,000,000 acres.**

2013

Incorporation of Dengue and Chikungunya Surveillance Program via BG traps.

2014

Use of VectorTests for Chikungunya virus.

2015

50 Year Celebration and broadening of other vectors to the Division's mission.

50

1965-2015

50 Years of "Fighting the Bite"
Primarily Against the *Culex* Mosquito


Avian Surveillance


Mosquito Surveillance


Field Mosquito Control Operations


Education & Training


Mosquito Inspections


Testing & Evaluation


Virology Laboratory


Geographic Information System (GIS)

HCPHES Approach to Fighting *Aedes*

- ***Understand*** *Aedes* vector predominance in Texas and Harris County
- ***Recognize*** need to shift from primarily *Culex*-based program to incorporation of *Aedes* mosquito as a targeted vector
- ***Emphasize*** importance of public education, personal protection, and source reduction as major components in fight against *Ae. aegypti and Ae. albopictus*
- ***Assure*** principles of "One Health" and health equity are applied to evolving multidisciplinary response

Aedes albopictus

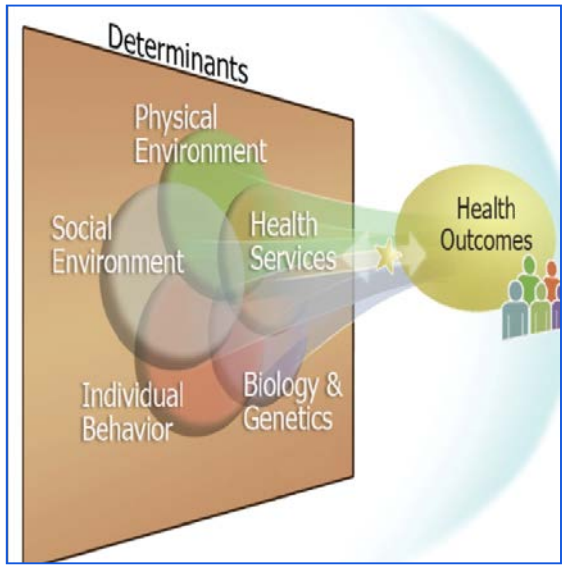
Aedes aegypti

Role of Health Equity, One Health, & MDT

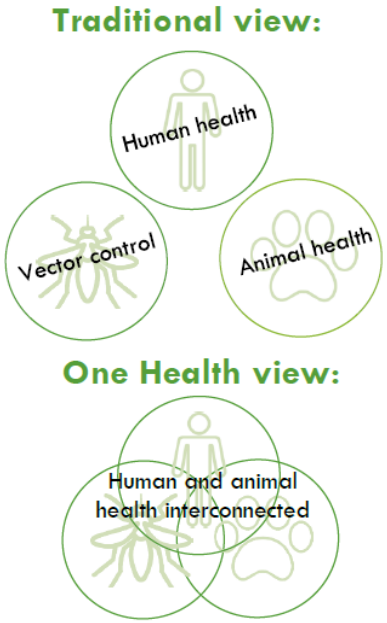
Multi-Disciplinary Team (MDT)

- An internal integrated team whose purpose is to conduct **targeted** mosquito control, epidemiological, environmental assessments of household perimeters and proximate areas to determine need for further interventions

Health Equity



One Health



MDT

HCPHES Confirms First Texas Zika Case — January 11, 2016

THE WALL STREET JOURNAL.

Texas Woman Diagnosed With Mosquito-Borne Zika Virus

Development raises concern that health crisis in Brazil is spreading

WIRED

SARAH ZHANG SCIENCE 02.06.16 7:00 AM

RIDE WITH THE MOSQUITO HUNTERS PROTECTING THE US AGAINST ZI

Harris County

HCPHES

Public Health & Environmental Services

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FOR IMMEDIATE RELEASE
January 11, 2016

Contact: Sandy Kachur
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Travel-Related Zika Virus Infection Has Been Identified in the Harris County Area

Harris County, Texas - Harris County Public Health & Environmental Services (HCPHES) has received confirmation from the Centers for Disease Control and Prevention (CDC) that the Zika virus has been confirmed in a traveler who recently returned from Latin America. The individual developed symptoms that are often associated with the Zika virus which include: fever, rash, and joint pain.

Zika virus is spread through the bite of the *Aedes* species mosquito. "Prevention is key to reducing the risk of Zika virus infection", stated Umair A. Shah, MD, MPH, Executive Director of HCPHES. "Zika virus infections occur throughout the world. We encourage individuals traveling to areas where the virus has been identified to protect themselves against mosquito bites, and to contact their healthcare provider immediately if they develop Zika virus-like symptoms."

According to CDC, illness from Zika is usually mild with symptoms lasting several days to a week. Severe disease requiring hospitalization is uncommon and deaths are rare. There is no vaccine to prevent or medicine to treat Zika virus infection. The CDC recommends that all people, especially pregnant women, who are traveling to areas where Zika virus is found, should take precautions to avoid mosquito bites to reduce their risk of infection of Zika virus as well as other mosquito-borne viruses such as dengue and chikungunya.

HCPHES recommends before traveling abroad, individuals contact their healthcare provider who may recommend vaccines or important preventive medication for travel-related diseases.

To learn more about the Zika virus, please visit: www.hcphes.org and www.cdc.gov.

HCPHES is the local public health agency for the Harris County, Texas jurisdiction. It provides a wide variety of publi activities and services aimed at improving the health and well-being of the Harris County community. For more inform please visit HCPHES at www.hcphes.org.

Follow HCPHES on Twitter @HCPHES and like us on Facebook.

www.hcphes.org

CBS NEWS

Zika virus confirmed in U.S. patient

A female Aedes aegypti mosquito / JAMES GATHANY, PROVIDED BY CDC/PAUL I. HOWELL, MPH; PROF. FRANK HADLEY COLLINS

theguardian

First case of tropical Zika virus linked to serious birth defect found in Texas

HCPHES Planned Zika Response Levels

- *Level 4 — Normal Conditions:* Travel-related Zika cases but no locally acquired cases in Harris County
- *Level 3 — Increased Readiness:* One case of locally acquired Zika in Harris County
- *Level 2 — High Readiness:* A few or cluster of cases of locally acquired Zika within Harris County
- *Level 1 — Maximum Readiness:* Widespread cases of locally acquired Zika throughout Harris County

***HCPHES ZIKA RESPONSE TEAM** — FORMED JANUARY 7, 2016*

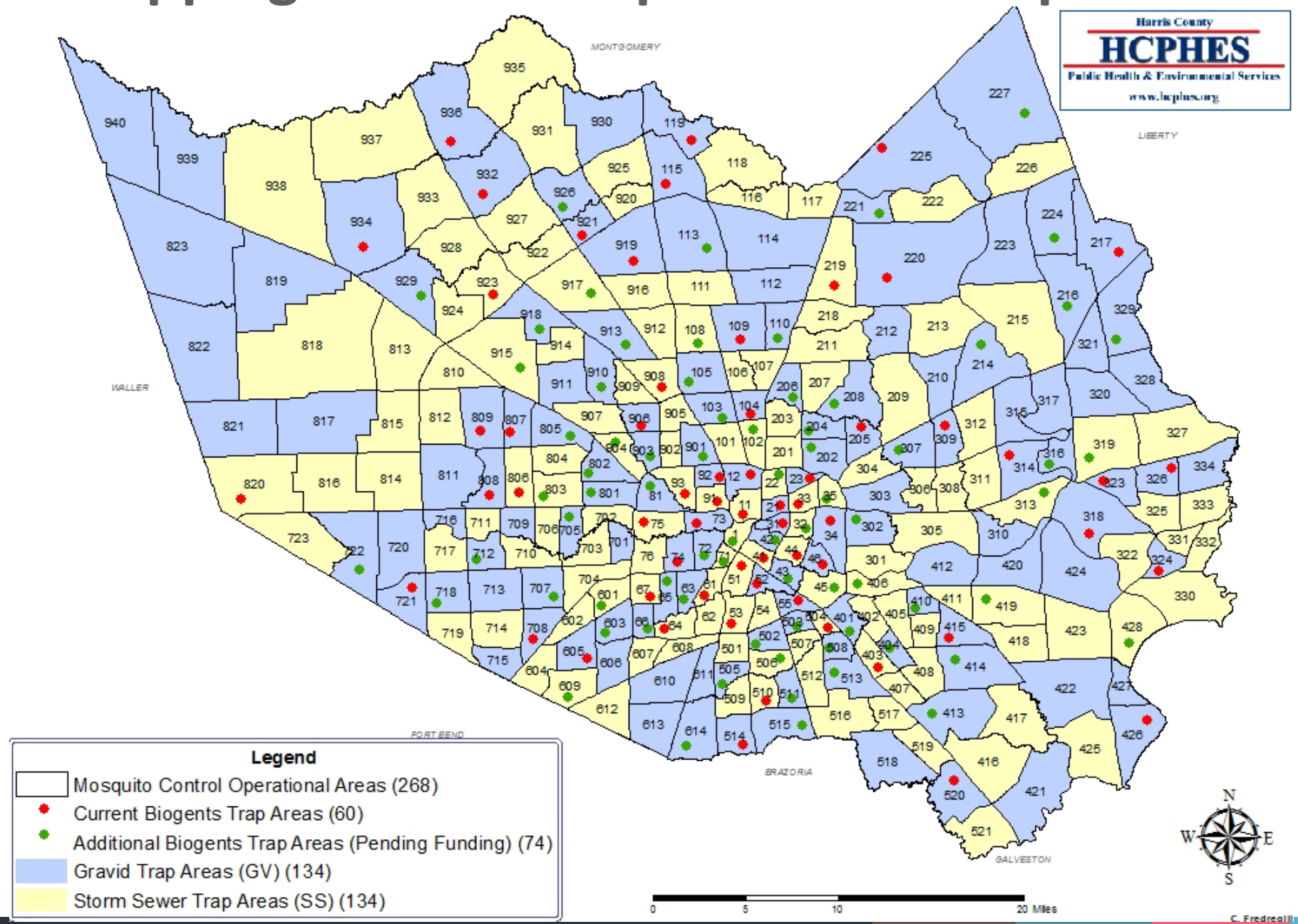
HCPHES Vector Surveillance and Control

- Utilize mosquito surveillance using (limited) historical data on *Ae. aegypti* combined with (expanded) surveillance including incorporation of predictive modeling within the 268 MC operational areas
- Generate GIS maps indicating key metrics such as mosquito population density levels of *Ae. aegypti*, Zika confirmed mosquito samples, local cases of human infections, and sources of breeding, etc.
- Conduct necessary staff training for inspectors, larvicide applicators, and other MC support personnel related to Zika and *Aedes*
- Acquire Zika-related testing materials and laboratory equipment for MC virology laboratory
- Work with partners and community members on key issues around reducing mosquito habitats

Types of Mosquito Traps Used in Harris County, TX

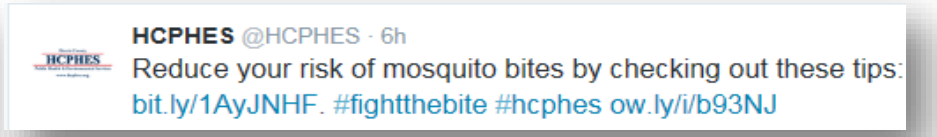
- Biogents (BG) Sentinel Trap (*Aedes)*
- Gravid Trap (*Culex & Aedes)*
- CDC Storm Sewer Trap (*Culex)*

HCPHES Trapping in 268 Mosquito Control Operational Areas



HCPHES Communications, Education and Engagement

- Conduct disease prevention education, personal protection, and source reduction campaigns
- Utilize media and other community partners to provide credible information
- Distribute insect repellent and other prevention modalities to local communities when possible and where appropriate
- Create messaging in languages most appropriate for affected communities, working with area consulates, etc.
- Conduct door to door education and outreach in targeted communities
- Engage federal, state, and local stakeholders to coordinate efforts



HCPHES Planned Zika Response Focus Areas

- Epidemiology Surveillance & Testing
- Healthcare Provider/Clinician Outreach
- Environmental Public Health
- Veterinary Public Health
- Legal Review and Authority
- Emergency Preparedness and Response

Select Zika Response Challenges

- The situation related to Zika is one that continues to evolve
- “We cannot spray our way out of this situation”
- Additive Arbovirus Response: *Culex*-based activities **plus** *Aedes*-based activities
- Addressing key logistical issues to ensure operational efficiencies
- Funding and resource needs

Centers for Disease Control and Prevention

the role of **Public Health** just makes **"Common Sense"**

Centers for Disease Control and Prevention

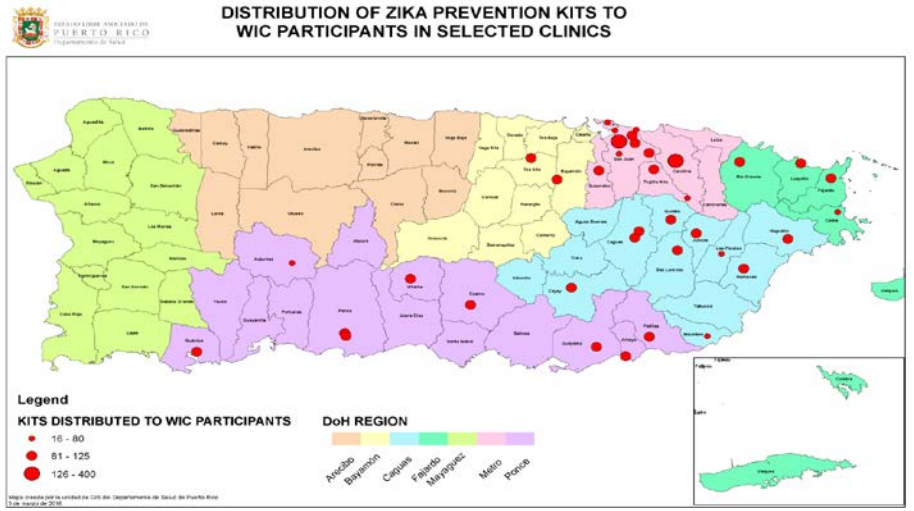
Zika Vector Control Strategies
The Puerto Rico Experience

Brenda Rivera-Garcia, DVM, MPH
Territorial Epidemiologist
Puerto Rico Department of Health

Estado Libre Asociado de Puerto Rico
Departamento de Salud

Zika Prevention Kits (ZPKs)

- Distribution
  - WIC clinics
  - Obstetricians
  - Drugstores with pregnancy kit purchase
- Components
  - Insect repellent: DEET 25%
  - Condoms
  - Bed nets
  - Educational materials
  - *Other components*



Temporary Screening Kits

- Viability
  - Wall and window/door styles, frames and surfaces
  - Financing
- Acceptability
- Coordination of services
- Pilot screening interventions

Insecticide Use

- Vector surveillance
  - Insecticide resistance patterns
- Delivery methods
  - ULV
  - Indoor/outdoor residual spraying
  - Aerial spraying
  - Larviciding

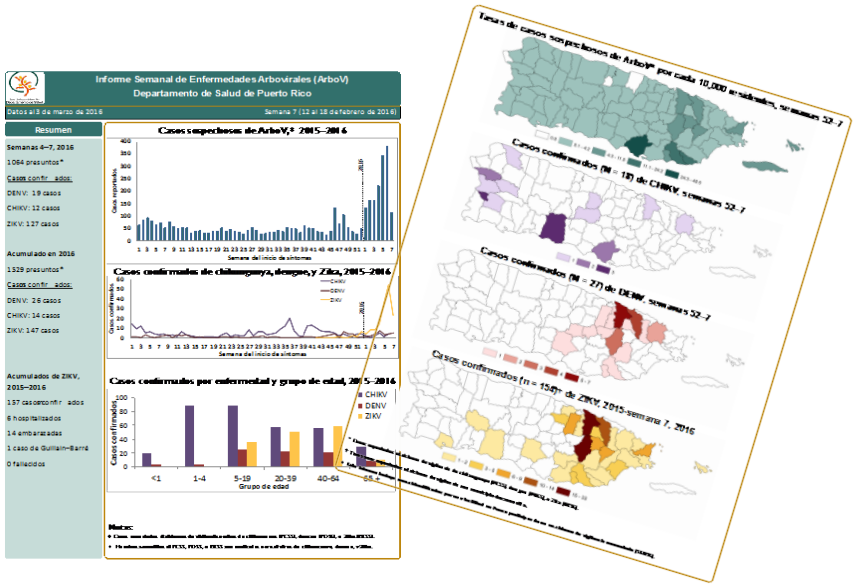
- Acceptability
- Federal and state regulations/permits
- Rollout logistics
  - Outsourcing versus state vector control programs
  - Engaging high risk populations and outreach community groups
  - Coordination of services

Behavioral and Messaging Studies

- **Zika Prevention Kit (ZPK)**
  - Evaluation ZPK among pregnant women in Puerto Rico
- **Interventions**
  - Vector control strategies and personal protective behaviors
    - Acceptability
- **Messages**
  - Messaging
  - Spokespersons

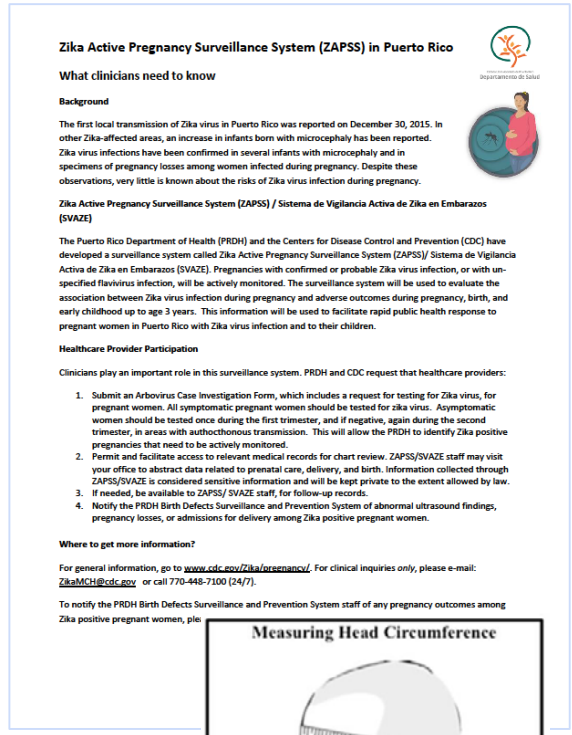
Communications

- Arbovirus weekly report
- Vector Control Interventions
- Zika prevention messaging
- Media



Surveillance Systems & Epidemiology

- Passive arboviral diseases surveillance system (PADSS)
- Zika Active Pregnancy Surveillance System (ZAPSS)
- Birth Defects: Congenital microcephaly
- Guillain-Barre syndrome passive surveillance system (GBSPSS)
- Zika infections associated to blood transfusion



Zika Active Pregnancy Surveillance System (ZAPSS) in Puerto Rico

What clinicians need to know

Background

The first local transmission of Zika virus in Puerto Rico was reported on December 30, 2015. In other Zika-affected areas, an increase in infants born with microcephaly has been reported. Zika virus infections have been confirmed in several infants with microcephaly and in specimens of pregnancy losses among women infected during pregnancy. Despite these observations, very little is known about the risks of Zika virus infection during pregnancy.

Zika Active Pregnancy Surveillance System (ZAPSS) / Sistema de Vigilancia Activa de Zika en Embarazos (SVAZE)

The Puerto Rico Department of Health (PRDH) and the Centers for Disease Control and Prevention (CDC) have developed a surveillance system called Zika Active Pregnancy Surveillance System (ZAPSS)/ Sistema de Vigilancia Activa de Zika en Embarazos (SVAZE). Pregnancies with confirmed or probable Zika virus infection, or with un-specified flavivirus infection, will be actively monitored. The surveillance system will be used to evaluate the association between Zika virus infection during pregnancy and adverse outcomes during pregnancy, birth, and early childhood up to age 3 years. This information will be used to facilitate rapid public health response to pregnant women in Puerto Rico with Zika virus infection and to their children.

Healthcare Provider Participation

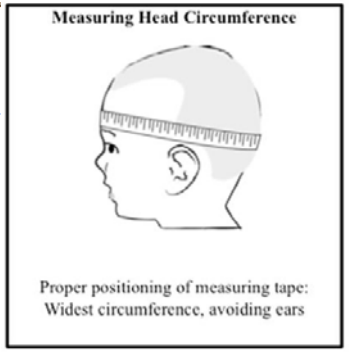
Clinicians play an important role in this surveillance system. PRDH and CDC request that healthcare providers:

1. Submit an Arbovirus Case Investigation Form, which includes a request for testing for Zika virus, for pregnant women. All symptomatic pregnant women should be tested for zika virus. Asymptomatic women should be tested once during the first trimester, and if negative, again during the second trimester, in areas with authocthonous transmission. This will allow the PRDH to identify Zika positive pregnancies that need to be actively monitored.
2. Permit and facilitate access to relevant medical records for chart review. ZAPSS/SVAZE staff may visit your office to abstract data related to prenatal care, delivery, and birth. Information collected through ZAPSS/SVAZE is considered sensitive information and will be kept private to the extent allowed by law.
3. If needed, be available to ZAPSS/ SVAZE staff, for follow-up records.
4. Notify the PRDH Birth Defects Surveillance and Prevention System of abnormal ultrasound findings, pregnancy losses, or admissions for delivery among Zika positive pregnant women.

Where to get more information?

For general information, go to www.cdc.gov/Zika/pregnancy/. For clinical inquiries *only*, please e-mail: ZikaMCH@cdc.gov or call 770-448-7100 (24/7).

To notify the PRDH Birth Defects Surveillance and Prevention System staff of any pregnancy outcomes among Zika positive pregnant women, ple

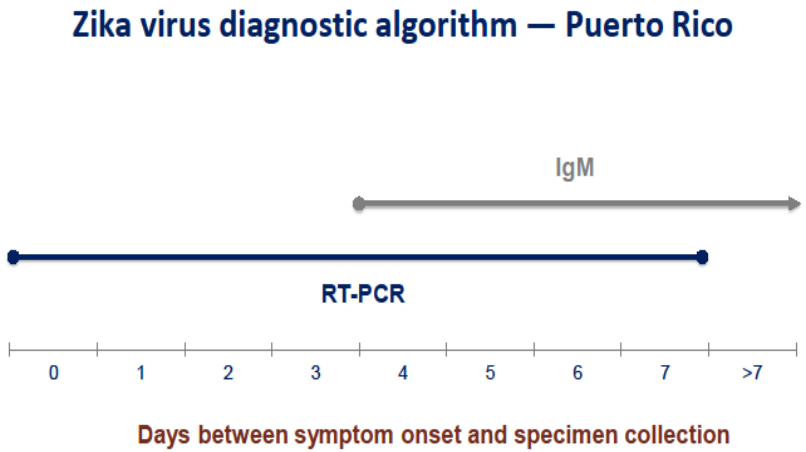


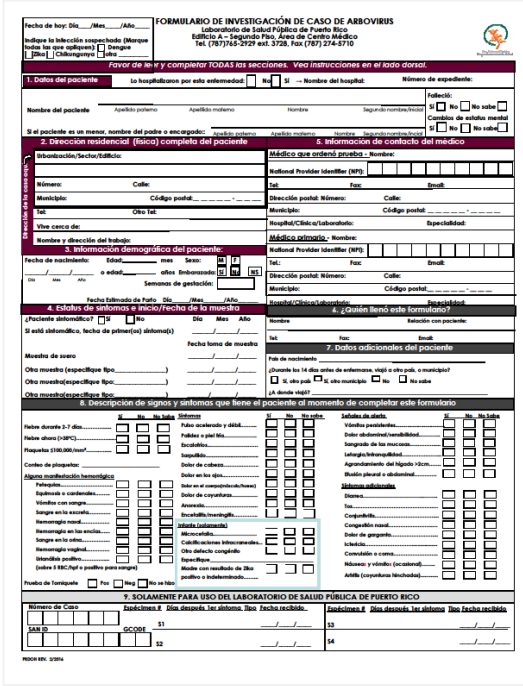
Laboratory Capacity

- CDC's developed *Trioplex* RT-PCR testing
  - DENV, CHIKV, ZIKV

- IgM testing
  - ZIKV, DENV*

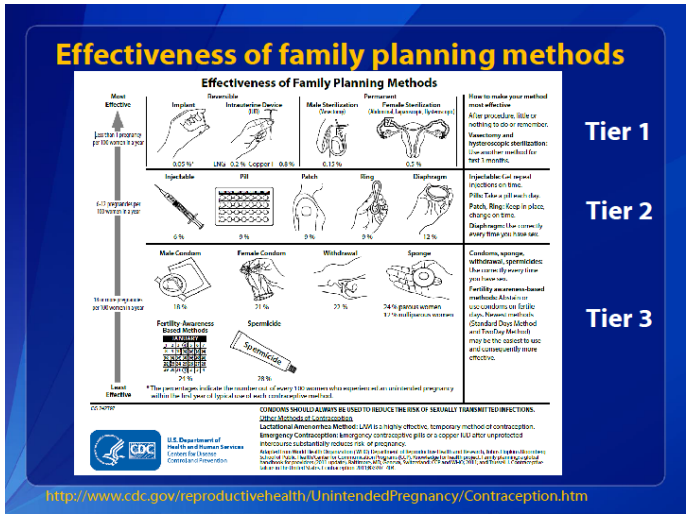
*Dengue endemic areas high rates of cross reactivity





Unintended Pregnancy Prevention

- Increase range of contraceptives options
  - Long acting reversibly contraceptives (LARCs)
  - Behavioral Risk Factor Surveillance System (BRFSS)



- Messaging
  - Women and men of reproductive age
  - Health care provider training

"We do not know how to prevent possible adverse birth outcomes related to Zika, but we do know how to prevent unintended pregnancies." -Dr. Thomas Frieden

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