



Mosquito Control Update

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Presentation Overview

- **Mosquito Control Overview**
- **Control Methods**
- **Mosquito-Borne Diseases**
- **Zika Update & Response Plans**
- **Summary**



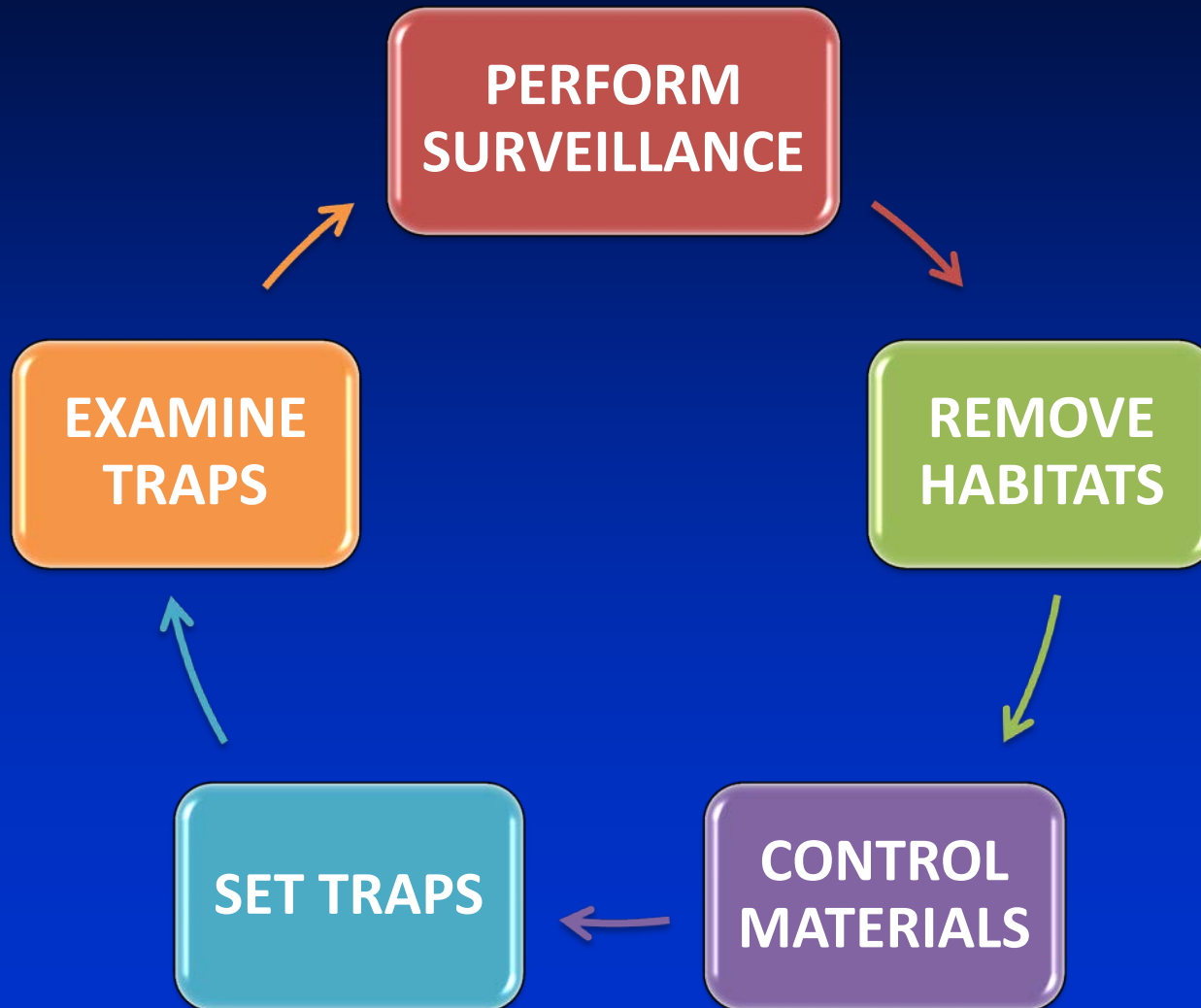
Mosquito Control Overview



“Integrated Mosquito Management”



Mosquito Control Overview





Mosquito Control Overview

- **29 Full Time Personnel**
 - Seasonal employees added as needed
- **26 vehicles on the road performing various functions**
 - Scheduled and unscheduled site visits
 - Setting and collecting traps
 - Removing artificial habitats
 - Applying control materials





Mosquito Control Overview

Trapping and Identification





Presentation Overview

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Control Methods

REMOVE HABITATS

Removal of Standing
Water

Homes, Public Areas,
Construction Sites

Most Effective Method
of Control

CONTROL MATERIALS

Larvicides &
Adulticides

Added to Water in
Artificial Containers

Applied by Hand, Truck
Mounted Sprayer or Aircraft



Control Methods

**REMOVE
HABITATS**

Removal of Standing
Water

Homes, Public Areas,
Construction Sites

Most Effective Method
of Control



- Citizen Assistance is Vital -





Control Methods

Juvenile Mosquito Control
Added to standing water

Adult Mosquito Control
Ultra-Low Volume Application
Barrier Treatments

**CONTROL
MATERIALS**

Larvicides &
Adulticides

Added to Water in
Artificial Containers

Applied by Hand, Truck
Mounted Sprayer or Aircraft



Control Methods

Bti

- Active ingredient derived from natural occurring bacteria in soil
- Low risk for humans and the environment
- Highly effective against *Aedes aegypti* & *albopictus*

Botanicals

- Active ingredients break down rapidly in sunlight
- Rigorously tested by EPA, low risk to humans
- Low risk for animals and pets
- Low risk to non-targets due to night time use and rate

Naled

- Extensive use since 1950s
- Degrades immediately on contact with surfaces, water and in sunlight
- Has not been shown to cause health problems in humans
- Does not harm animals, fish or honey bee populations when applied according to law



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Mosquito-Borne Diseases

Not all mosquitoes are the same. Different mosquitoes spread different viruses and bite at different times of the day.



Type of Mosquito

Viruses spread

Biting habits



Aedes aegypti,
Aedes albopictus

Chikungunya,
Dengue, Zika

Primarily daytime, but
can also bite at night



Culex species

West Nile

Evening to morning



Mosquito-Borne Diseases

How Do Mosquitoes Spread Viruses like Zika?

Person gets infected by mosquito or human contact

Aedes mosquito bites the infective person during 1st week of infection

Infective mosquito lives long enough for virus to multiply

Infective mosquito bites another person and process is amplified in a population



Mosquito-Borne Diseases

Established Diseases in Florida

- Chikungunya
- Dengue Fever
- Dog Heartworm
- Eastern Equine Encephalitis
- St. Louis Encephalitis
- West Nile Virus
- **ZIKA VIRUS**
- *Yellow Fever (on the horizon)*





Mosquito-Borne Diseases

- *Aedes aegypti*

- Because they live near and prefer to feed on people, they are more likely to spread viruses than other types of mosquitoes

- *Aedes albopictus*

- These mosquitoes feed on animals as well as people, they are less likely to spread viruses like Zika, dengue and chikungunya





Mosquito-Borne Diseases

- *Aedes aegypti*

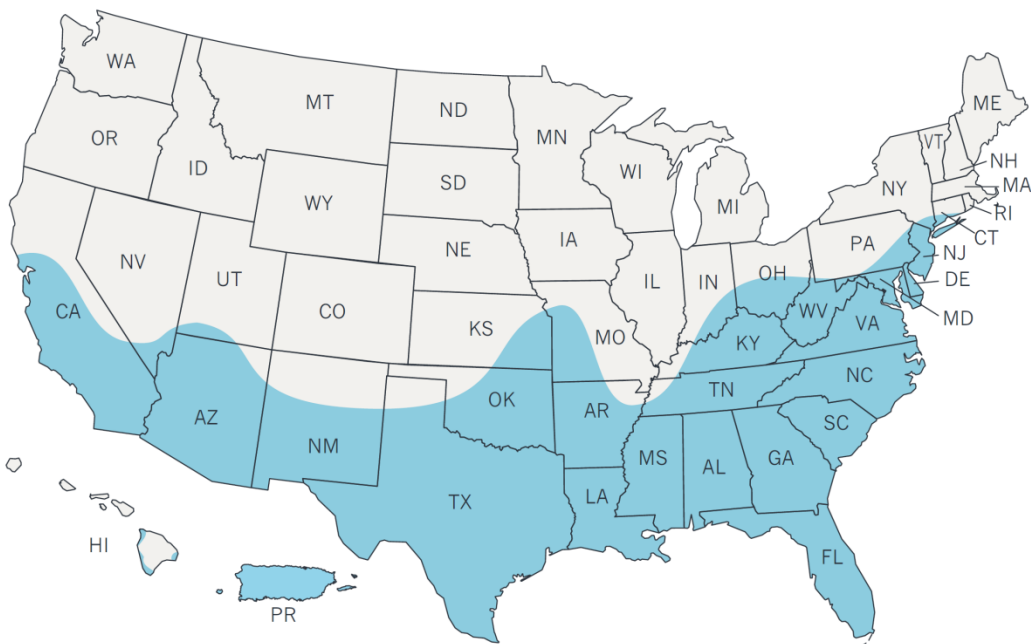
- *Aedes albopictus*

Noticeable black and white markings on their body and legs

Unlike other mosquitos, they are active and bite during the daytime

Peak biting periods are early morning and in the evening before dusk

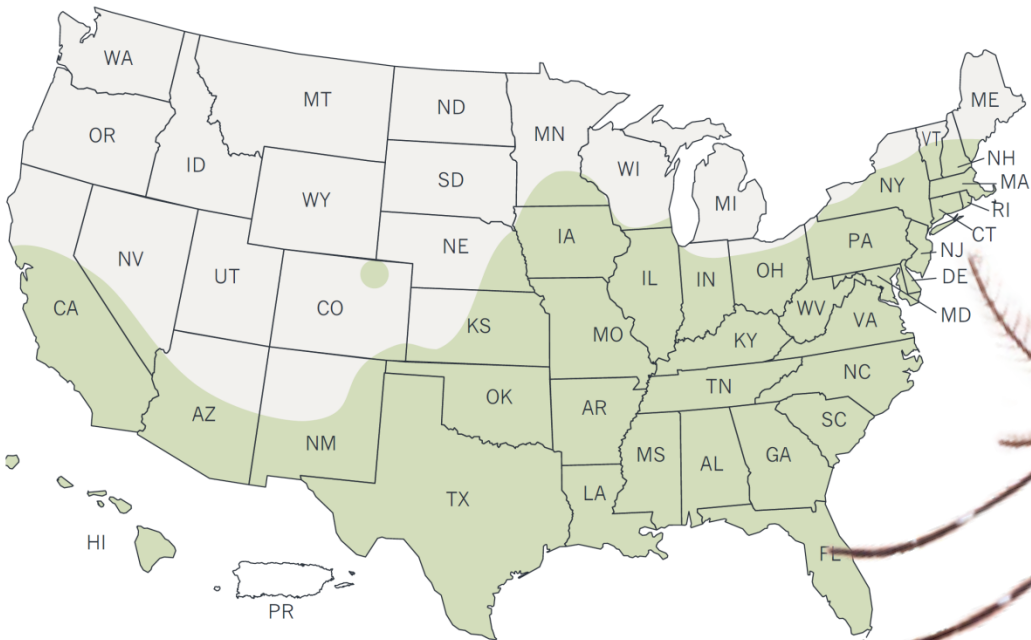




Aedes aegypti



Aedes albopictus



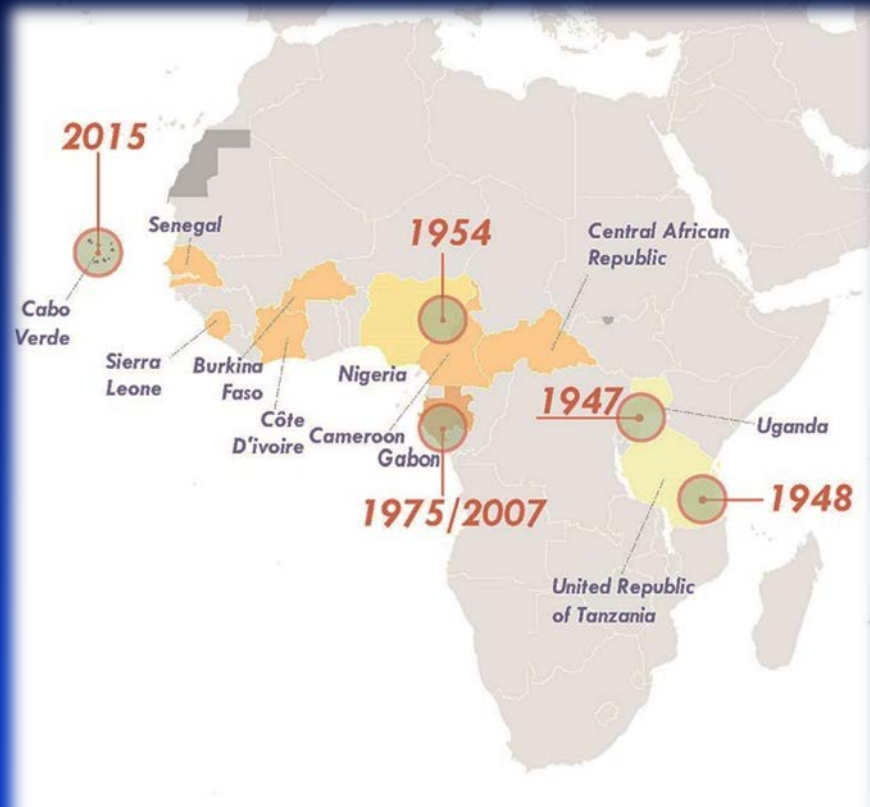
Potential Range in US

These mosquitoes live in tropical, subtropical, and in some temperate climates.





Mosquito-Borne Diseases



Zika Virus

1947

1952

2007

2014

2016



Mosquito-Borne Diseases

■ Clinical Presentation

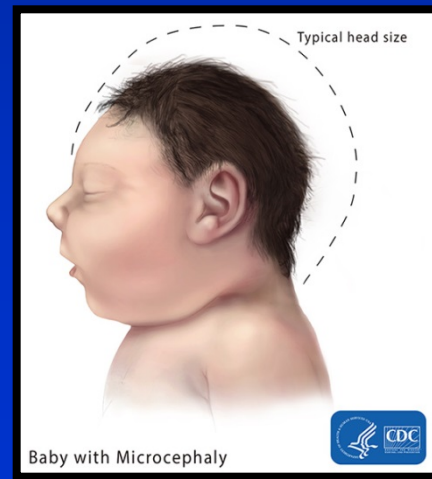
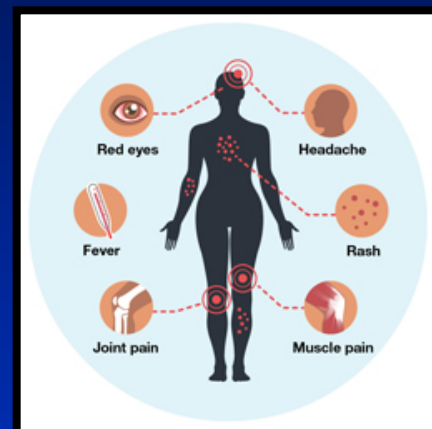
- Usually mild symptoms that resolve in 1 week
- 80% of those infected have no symptoms
- Rash, fever, joint pain, conjunctivitis
- Linked to microcephaly and fetal demise

■ Blood or urine tests required for confirmation

■ No treatment or vaccine available yet

■ One in 10 pregnant women with Zika Virus had a fetus or baby with neurologic defects

Zika Virus





Mosquito-Borne Diseases

Main source of protection is to limit exposure

- Use EPA registered insect repellent
- Cover up with long sleeve shirt & pants
- Control mosquitos outside and inside your home

Active ingredient

Higher percentages of active ingredient provide longer protection

DEET

Picaridin (known as KBR 3023 and icaridin outside the US)

IR3535

Oil of lemon eucalyptus (OLE) or para-menthane-diol (PMD)

2-undecanone



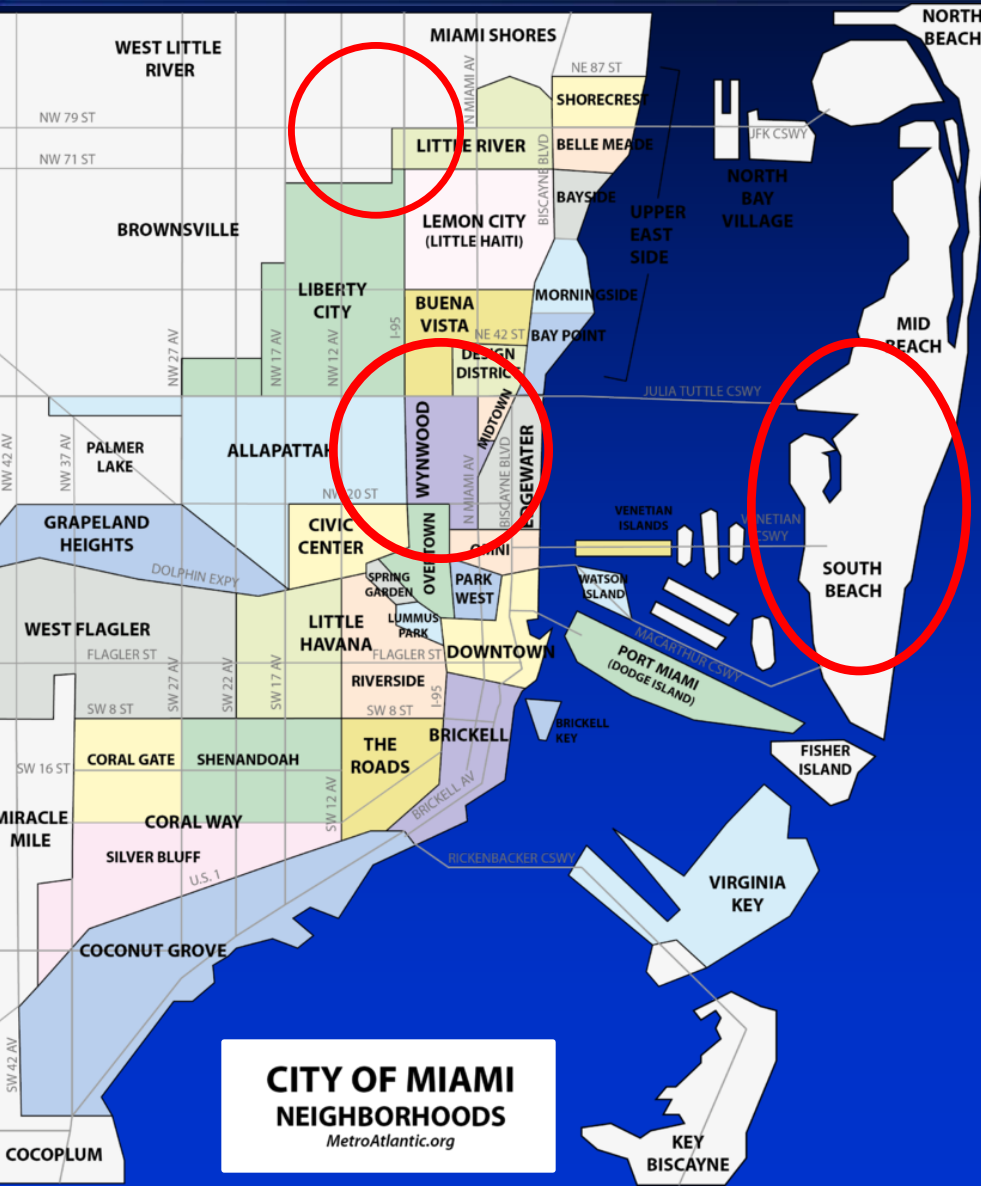


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Zika Update & Response



2016 Local Transmission

- Miami-Dade County
- First travel warning from within continental USA
- Total of 272 cases
- Significant impact on local economy
- Aggressive Mosquito Control operation
- Outbreak controlled quickly



Zika Update & Response

Florida (Statewide)	2016	2017
<i>Travel-Related Infections of Zika</i>	1,118	33
<i>Locally Acquired Infections of Zika</i>	285	2
<i>Undetermined</i>	46	7
<i>Pregnant with Lab-Evidence of Zika</i>	296	23



Zika Update & Response

OC Mosquito Control Zika Activity	2016	2017
<i>Suspect cases of Zika</i>	797	159
<i>Number of Properties Visited</i>	79,700	22,200
<i>Confirmed Zika Cases (Travel related)</i>	167	1
<i>Confirmed Locally Transmitted Zika</i>	0	0
<i>Mosquito Tests Positive for Zika</i>	0	0



Zika Update & Response

What happens when ZIKA is SUSPECTED

- Patient suspected to have ZIKA is seen by a community physician
- Physician orders ZIKA blood or urine test
- FL-DOH mandatory reporting even before results are back
- FL-DOH notifies OC Mosquito Control of a suspected case
- Location of case provided (no specific address)



Zika Update & Response

What We Do For every SUSPECTED case of ZIKA

- Crews perform surveillance within 225 feet of location provided by DOH
- Removal of breeding habitats & set traps
- Apply control materials in the area
- Leave door hangers
- Return in 24 hours
- If traps have *Aedes* mosquitoes, repeat the above and test mosquitoes for ZIKA





Zika Update & Response

Access to private property is a challenge during surveillance and abatement efforts





Zika Update & Response

What We're Doing Now...

■ Operations

- Assessing staffing needs for upcoming season
- Evaluating new control modalities



■ Proactive Communications

- Mosquito Control has been featured in dozens of media reports
- OC website has links to education and PSAs regarding Zika
- Consistent social media outreach



Zika Update & Response

What We're Doing Now...



- **Engagement with Community**
 - Education to CFHLA, Private Pest Control, EMS, GOAA, OCPS
- **Coordinating with State and Local Public health**
- **Engagement with Staff**
 - Collaboration with HR, Directors and Managers





Zika Update & Response

If Locally Transmitted Case Occurs...

- **Orange County Mosquito Control**
 - Increase Surveillance & Abatement
 - Utilize Citizen Emergency Response Teams, HOA volunteers, and Medical Reserve Corps for manpower
 - May require additional temporary staffing

- **Department of Health**
 - Test for Zika among contacts of positive cases
 - Facilitate access to private property
 - Maintain high degree of coordination with County





Zika Update & Response

If Locally Transmitted Case Occurs...

- **Orange County Communications**
 - Organize press releases, PSAs, and media events to inform and engage the community
 - Coordinate messaging with partners in tourism, schools, etc.

- **Orange County Emergency Management**
 - Coordinate with MC to assess resource gaps
 - Liaison with State EOC, FL DOH and CDC
 - Assist in organizing community outreach





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Summary

- Integrated Mosquito management coordinates the efforts of Public Health, Mosquito Control and Public information
- Active efforts and planning currently happening
- The most effective method to control mosquito populations is remove their breeding habitat

- EVERYONE CAN DO THIS -

- When Control Materials are used, we carefully select those with the best safety and environmental profile



Summary

- **Mosquito-borne diseases are a serious public health threat**
- **Best way to protect yourself and family is cover up**
- **Use EPA registered repellent**
- **And control mosquitoes outside and inside your home**
- **CDC, Florida DOH and OC websites are great resources to learn more**





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