

21st Annual Chicago Infection Control Conference

May 20, 2016

Daniel Markowski, PhD

Vice President, VDCI

Dr. Markowski has disclosed that there is no actual or potential conflict of interest in regards to this presentation

The planners, editors, faculty and reviewers of this activity have no relevant financial relationships to disclose. This presentation was created without any commercial support.

To obtain credit you must:

- Be present for the entire session
 - Complete an evaluation form
 - Return the evaluation form to staff
- Certificate will be sent to you by e-mail upon request.

This course is eligible for 6 *AMA PRA Category 1 Credit™*

Accreditation and Designation Statement: Rush University Medical Center is accredited by the Accreditation Council for Continuing Medical Education to provide continuing medical education for physicians. Rush University Medical Center designates this live activity for a maximum of 6 AMA PRA Category 1 Credit(s)™ Physicians should claim only credit commensurate with the extent of their participation in the activity.

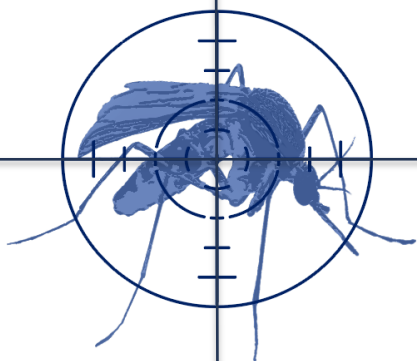
Rush University is accredited as a provider of continuing nursing education by the American Nurses Credentialing Center's Commission on Accreditation. Rush University designates this live/internet enduring material activity for 6 Continuing Education credit(s).

This activity is being presented without bias and without commercial support.

Rush University is an approved provider for physical therapy (216.000272), occupational therapy, respiratory therapy, social work (159.001203), nutrition, speech-audiology, and psychology by the Illinois Department of Professional Regulation. Rush University designates this live activity for 6 Continuing Education credit(s).

Surveillance and Control of Zika Vectors

Daniel Markowski, PhD
dmarkowski@vdcii.net



21st Annual Infection
Control Conference

VECTOR DISEASE CONTROL INTERNATIONAL
PROTECTING PUBLIC HEALTH SINCE 1992

Zika Zika Zika !

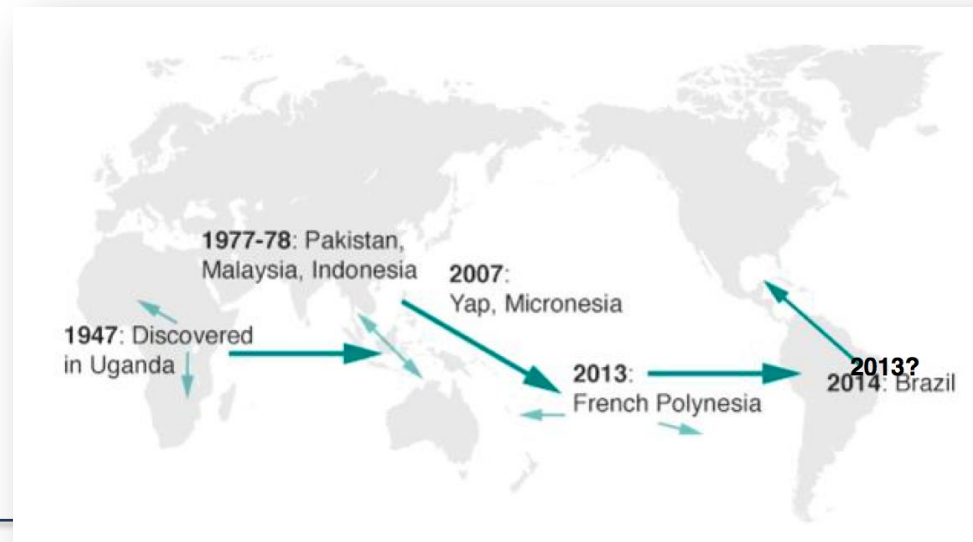


Oh My



Zika Zika Zika !

- 1947 – First discovered from the Zika Forest in Uganda
- Flavivirus, similar to Yellow Fever and West Nile virus
- 2007 – Yap Island Outbreak was the first time it was detected outside Africa or Asia
- 2014 – first detected in South America



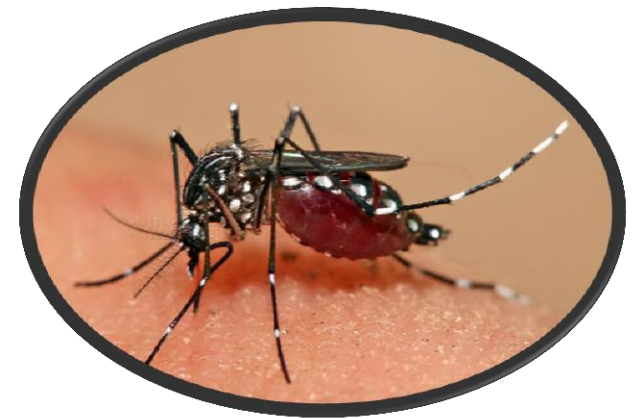
Zika Zika Zika !

From South America to a backyard near you...



How do you get it?

- Vector-borne – *Aedes aegypti*, possibly *Aedes albopictus*
- Vertical transmission (mother to baby)
- Sexual
- Transfusion cases (2 recently documented)
- Lab exposures
- Detected in breast milk, saliva, and urine but no documented transmission



Symptoms

- Incubation period: 2-14 days
- 1 in 5 people infected will become symptomatic
- Most common symptoms:
 - Fever
 - Rash
 - Joint Pain
 - Red Eyes
 - Muscle Ache
 - Headache
 - Eye Pain
 - Vomiting



So what's the problem?

- Major risk is to the developing fetus of pregnant women, causing miscarriage and birth defects (microcephaly)
- There is no vaccine or available to prevent/treat infected individuals

drug



Rising Case Rates in Brazil

&

World Health Organization
declared Zika virus disease:

Public Health Emergency of International
Concern (PHEIC)
on 1st February, 2016.



Issued Travel Warnings

- Travel Alert Level 2-Practice Enhanced Precautions
- Pregnant women in any trimester should postpone travel
- Women trying to become pregnant should consult healthcare provider before travel
- Avoid mosquito bites



Focus on the Vector

Aedes aegypti

- Transmitted to people through the bite of an infected mosquito (*Ae. aegypti* or *Ae. albopictus*)
- These mosquitoes lay eggs in natural and artificial containers
- They are aggressive daytime biters.
- Live near and prefer to bite humans
- Mosquitoes become infected when they feed on a person already infected with the virus
- Infected mosquitoes can then spread the virus to other people through bites
- Don't forget... Spread of the virus through blood transfusion and sexual contact has been reported



Distribution in the United States

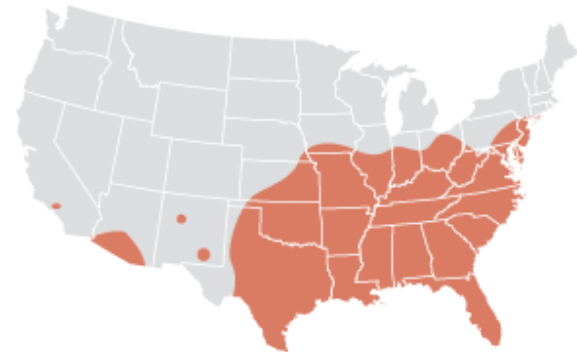
THE MOSQUITOS THAT SPREAD ZIKA VIRUS

Zika virus is primarily transmitted to humans from *Aedes aegypti* mosquitos, but *Aedes albopictus* mosquitos have also been identified as potential carrier. Here's where each might live in the United States.

Approximate distribution of *Aedes aegypti* mosquitos



Approximate distribution of *Aedes albopictus* mosquitos

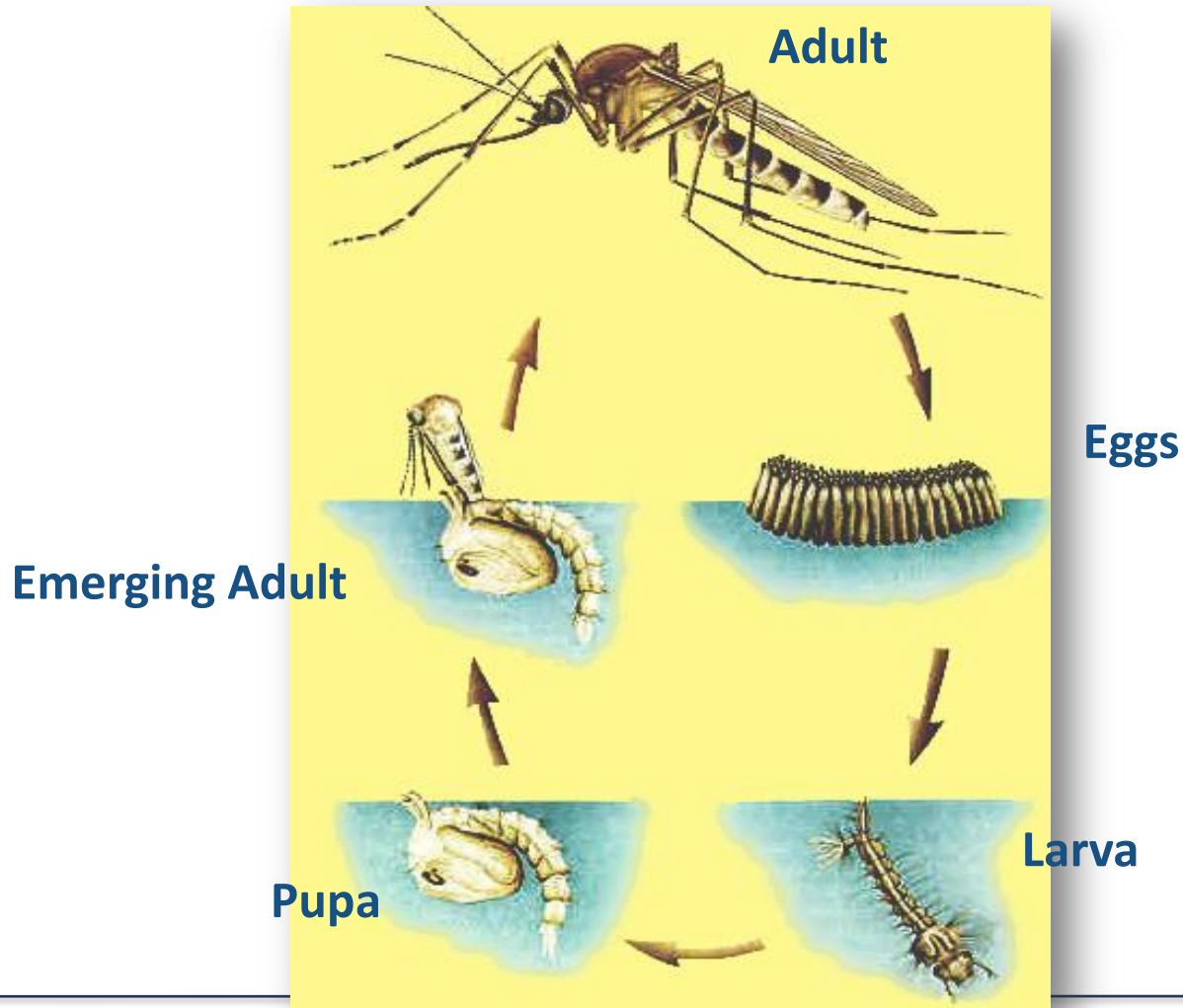


NOTE | Mosquito populations may be detected in areas not shaded on this map, and may not be consistently found in all shaded areas.

SOURCE | Centers for Disease Control and Prevention



Mosquito Life Cycle



aegypti/albopictus Larval Habitat

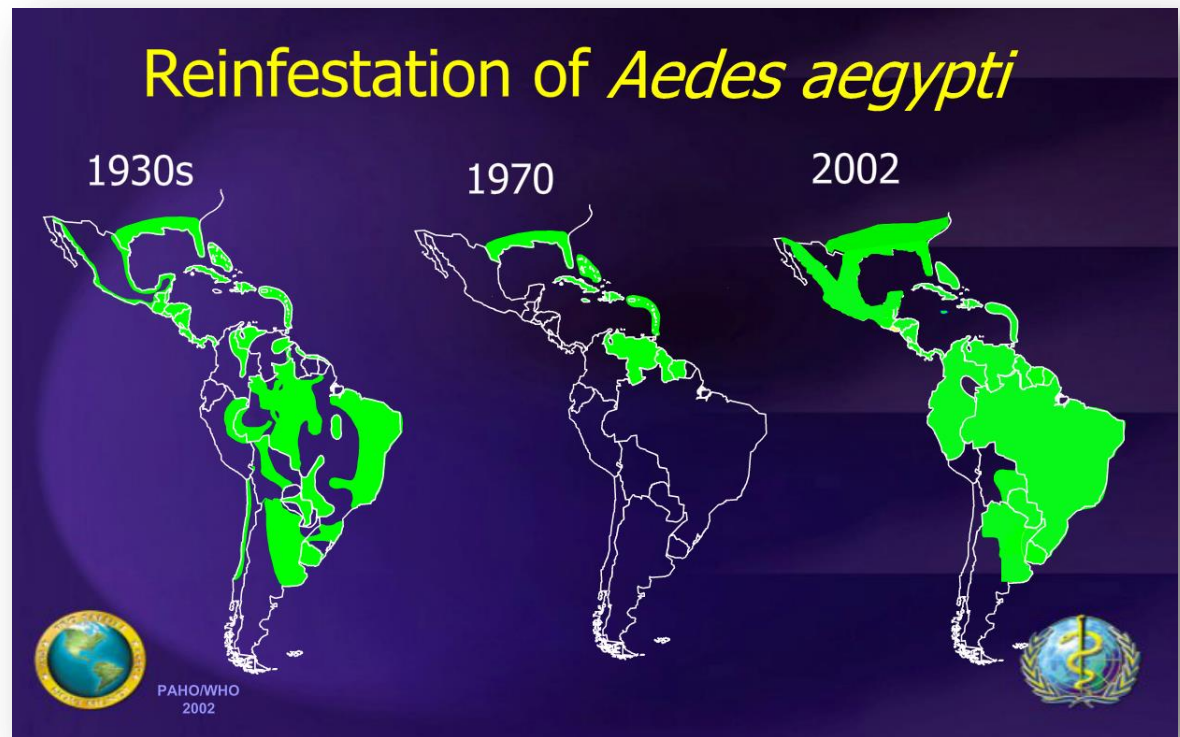


- Buckets, cans, bottles
- Barrels, trash Cans
- Swimming Pools
- Gutters
- Recycle Containers
- Tires, Tires, Tires



Difficult Species to Deal With

- Breeds... every where
- Day time feeding, readily rests indoors
- Prefers humans



Surveillance Tools

A different species – A different trap



BG - GAT



BG - Sentinel



Ovi Trap



Control Measures

Traditional Methods for Control:

- Public Outreach and Education
- Source Reduction – Tire and Trash Clean up
- Door-to-door Residual Sprays (indoor and outdoor)



Problems with this Approach

- People Don't Listen
- The world's population has grown tremendously
- Urban housing areas more dense
- New products do not provide long-lasting control
- Limited resources



How do you larvicide this?



...Or this?



2016 Response Plan with CDC

- VDCI was selected as the Centers for Disease Control and Prevention (CDC) provider of mosquito control services.
- Have current ZIKV management teams in US Virgin Islands, Marshall Islands and Guam.
- Coordinate regularly with CDC response teams in the US.



Our Approach with CDC

- BTI Larvicide as a ULV Application



Our Approach with CDC

- Combined with “Barrier” Adulticide



Focus Efforts in High Risk Areas

- Homes with pregnant women
- Schools/Hospitals
- Others Public Areas (churches, parks, etc.)

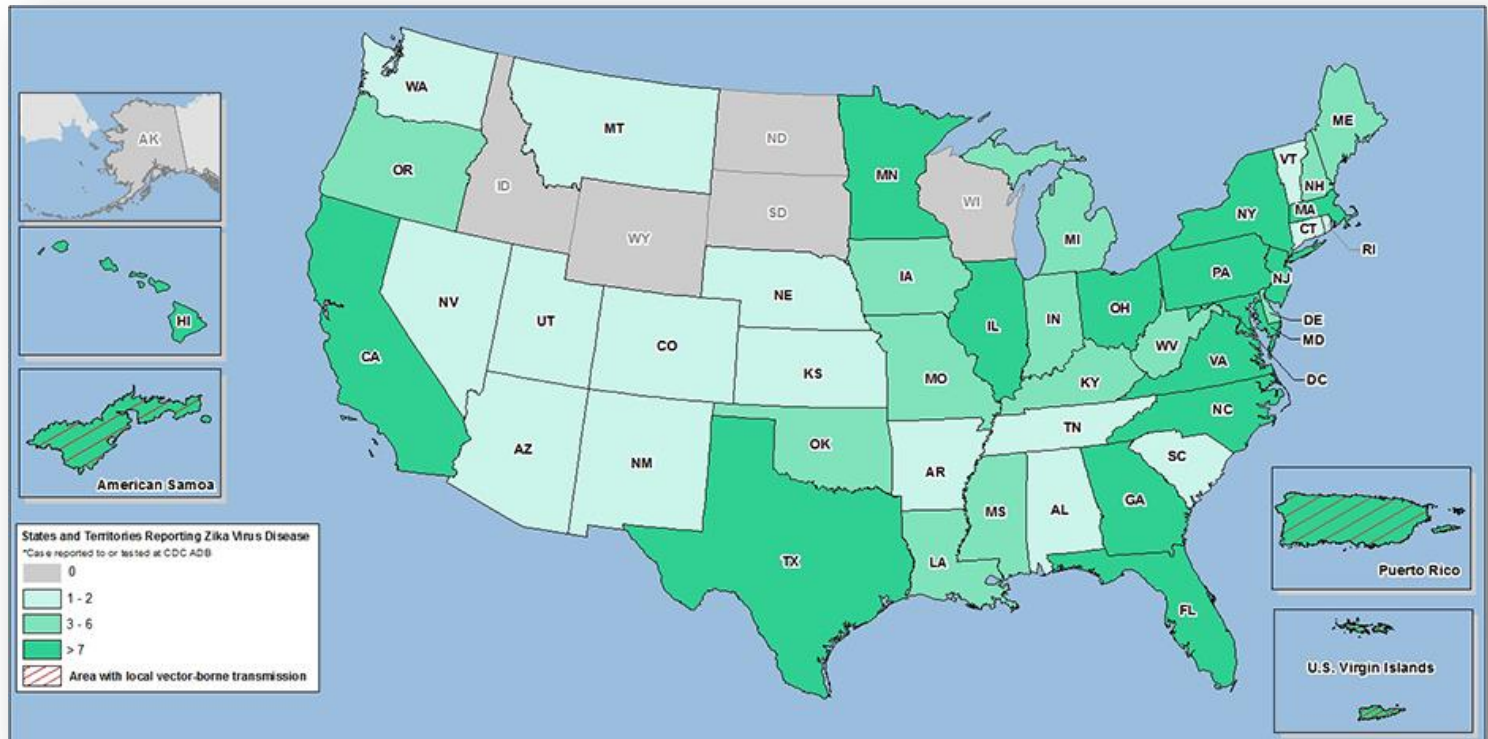


Local Agency Coordination

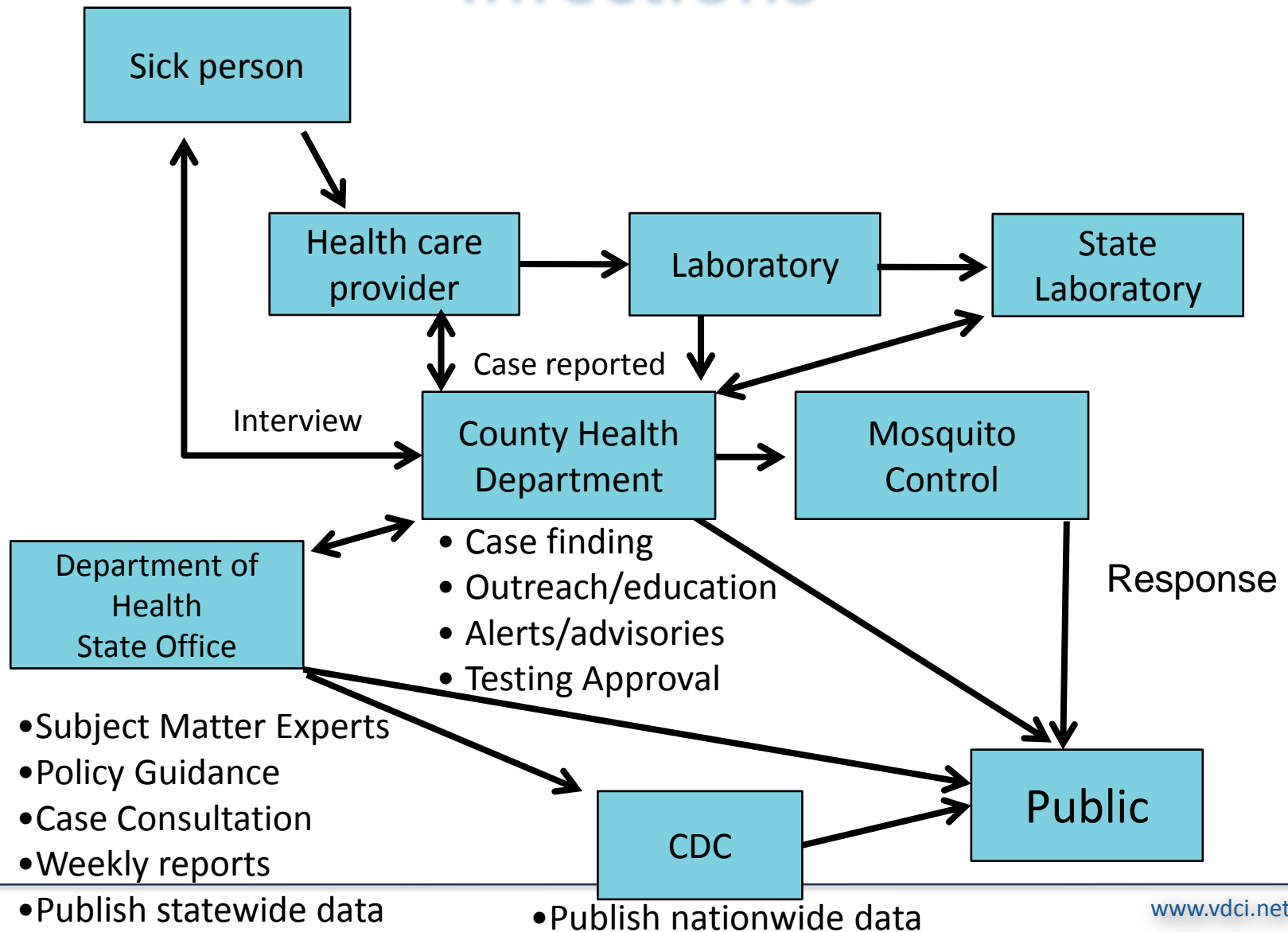


What about back on the Big Island?

Zika virus disease in the United States, 2015–2016



LHDs will investigate possible Zika Infections



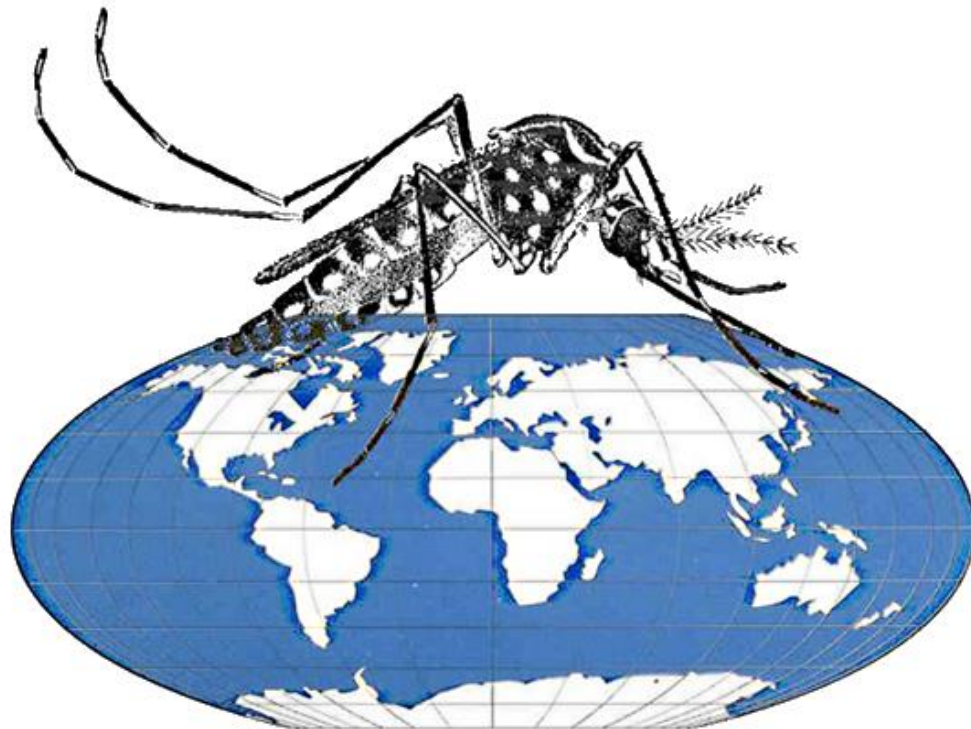
Mosquito Control Districts

- Identify areas that may be at risk for high *Aedes albopictus* populations or *Ae. aegypti* introductions
- Surveillance in those areas
- Incorporating public health messaging and stress personal precautions and removing standing water
- Communication with LHDs
- Hose them suckers down



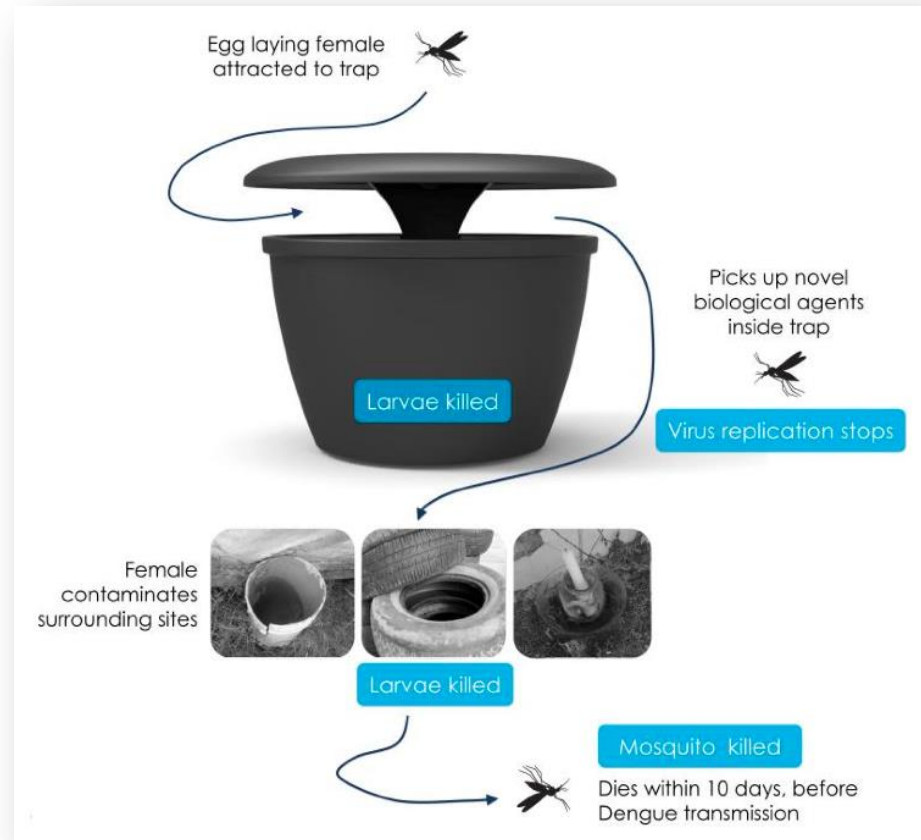
Difficulties with Surveillance and Control Efforts

- This species is very focal in distribution
- Must have homeowner involvement



Novel Approaches to Control

Autocidal Gravid Traps



Thank You

