

# Notes From the Field: Expanding Surveillance Related to Zika Virus

February 7, 2018  
1:00-2:00 PM (ET)



Council of State and Territorial Epidemiologists

# Webinar Housekeeping



- **Today's webinar is being recorded**
  - The webinar recording and presentation slides will be available in the webinar library on CSTE's website:  
<http://www.cste.org/?page=WebinarLibrary>
- **All lines have been muted**
- **There will be a question-and-answer session at the end of the webinar**
  - To ask a question, please use the Q&A box on the right side of your screen

# Webinar Objectives



Participants will:

- Registrants will be able to describe how public health jurisdictions can collaborate with the US military to expand on surveillance capacities
- Registrants will be able to describe how public health jurisdictions can collaborate with mosquito control districts to expand surveillance and monitoring capacities
- Registrants will be able to describe how public health jurisdictions can use the resources of “citizen scientists” to expand mosquito surveillance and monitoring capacities

# Zika Virus Vector Surveillance Activities



**ARMY PUBLIC HEALTH CENTER**



LTC Jeffrey Clark, PhD

Entomological Sciences Program  
September 2016

- Army entomological expertise and support found in three core areas:
  - Installation (garrison) IPM
  - Deployed IPM
  - Research and development

- Hospital environmental section responsible for surveillance on large installations
  - May cover satellite installations
- The responsibility of vector control on installations falls under Army Environmental Command
  - May be contracted out
  - May or may not conduct surveillance
  - May or may not coordinate with hospital environmental shop

- Pathogen testing services provided by Regional Public Health Commands (RPHCs)
  - Installations send collected specimens to supporting Command
    - IDs verified and species tested for appropriate pathogens
  - Results sent to customer
- Testing results sent to Army Public Health Center (APHC) for archival
  - Compliance variable
  - Considerable time lag



- In 2016 installations were required to conduct surveillance and submit collections per MEDCOM OPORD 16-37
- Raw data submitted to APHC from Regional PHCs weekly
- APHC provided a monthly report of surveillance activities

ZIKA SURVEILLANCE LOG										Collector: Complete columns A - J PHC Entomologist: Verify column J and complete columns K - L PHC Lab: Complete columns M - S *Hover cursor over column headers for comments**									
COLLECTION INFORMATION										VECTOR ID			TEST RESULTS				LAB PROCESSING		
Date Trap Set	Date Trap Collected	Collection code	State or Province	Installation / Camp / Base	Specific Location/Trap #	Collecting Method/Trap Type	Life Stage Collected	Vector Count	Genus	Species	Identified By	ZKV	WNV	CHKV	DENV	Date rec'd by Lab	Lab eLIMS/ LIMS #	Pathogen Testing Organization	
19-Apr-16			GUAM	Naval Base Guam	2	CDC/CO2	Adult	1	Aedeomyia	catasicta		NT	NT	NT	NT			PHC-Pacific	
18-Jul-16	19-Jul-16	HILL-16-0001	Virginia	A.P. Hill, Fort	30	BG Sentinel trap/ Day	Adult	1	Aedes	albopictus		ND	NT	ND	ND	25-Jul-16		PHC-Atlantic	
19-Jul-16	19-Jul-16	HILL-16-0002	Virginia	A.P. Hill, Fort	30	BG Sentinel trap/ Day	Adult	4	Aedes	albopictus		ND	NT	ND	ND	25-Jul-16		PHC-Atlantic	
18-Jul-16	19-Jul-16	HILL-16-0004	Virginia	A.P. Hill, Fort	33	BG Sentinel trap/ Day	Adult	1	Aedes	albopictus		ND	NT	ND	ND	25-Jul-16		PHC-Atlantic	
25-Jul-16	26-Jul-16	HILL-16-0005	Virginia	A.P. Hill, Fort	30	BG Sentinel trap/ Day	Adult	9	Aedes	albopictus		ND	NT	ND	ND	29-Jul-16		PHC-Atlantic	
25-Jul-16	26-Jul-16	HILL-16-0006	Virginia	A.P. Hill, Fort	30	BG Sentinel trap/ Day	Adult	15	Aedes	albopictus		ND	NT	ND	ND	29-Jul-16		PHC-Atlantic	
1-Aug-16	2-Aug-16	HILL-16-0008	Virginia	A.P. Hill, Fort	36	BG Sentinel trap/ Day	Adult	9	Aedes	albopictus		ND	NT	ND	ND	9-Aug-16		PHC-Atlantic	
18-Jul-16	19-Jul-16	APGA-16-0023	Maryland	Aberdeen Proving Ground, Aberdeen	8	BG Sentinel trap/ Day	Adult	1	Aedes	albopictus		ND	NT	ND	ND	29-Jul-16		PHC-Atlantic	
28-Jun-16	29-Jun-16	APGE-16-0002	Maryland	Aberdeen Proving Ground, Edgewood	5	BG Sentinel trap/ Day	Adult	1	Aedes	albopictus		ND	NT	ND	ND	29-Jul-16		PHC-Atlantic	
12-Jul-16	13-Jul-16	APGE-16-0008	Maryland	Aberdeen Proving Ground, Edgewood	4	BG Sentinel trap/ Day	Adult	3	Aedes	albopictus		ND	NT	ND	ND			PHC-Atlantic	
18-Jul-16	19-Jul-16	APGE-16-0009	Maryland	Aberdeen Proving Ground, Edgewood	4	BG Sentinel trap/ Day	Adult	1	Aedes	albopictus		ND	NT	ND	ND	29-Jul-16		PHC-Atlantic	
12-Apr-16			Hawaii	Alamamu Military Reservation	5	BG Sentinel	Adult	1	Aedes	albopictus		NT	NT	NT	NT			PHC-Pacific	
14-Apr-16			Hawaii	Alamamu Military Reservation	5	BG Sentinel	Adult	1	Aedes	albopictus		NT	NT	NT	NT			PHC-Pacific	
5-May-16			Hawaii	Alamamu Military Reservation	4	BG Sentinel/CO2	Adult	1	Aedes	albopictus		NT	NT	NT	NT			PHC-Pacific	
5-May-16			Hawaii	Alamamu Military Reservation	5	BG Sentinel/CO2	Adult	2	Aedes	albopictus		NT	NT	NT	NT			PHC-Pacific	
8-Jun-16			Hawaii	Alamamu Military Reservation	3	BG Sentinel	Adult	1	Aedes	albopictus		NT	NT	NT	NT			PHC-Pacific	
9-Jun-16			Hawaii	Alamamu Military Reservation	3	BG Sentinel	Adult	2	Aedes	albopictus		NT	NT	NT	NT			PHC-Pacific	
9-Jun-16			Hawaii	Alamamu Military Reservation	5	BG Sentinel	Adult	2	Aedes	albopictus		Pending	NT	Pending	Pending			PHC-Pacific	
26-Jun-16	27-Jun-16	ANWX-16-0024	District of Columbia	Anacostia Annex	6	Gravid Trap CDC John Hoci	Adult	1	Aedes	albopictus		ND	NT	ND	ND			PHC-Atlantic	
2-Aug-16	3-Aug-16	ANWX-16-0072.1	District of Columbia	Anacostia Annex	6	BG Sentinel trap/ Day	Adult	1	Aedes	albopictus		ND	NT	ND	ND	9-Aug-16		PHC-Atlantic	
18-Jul-16	19-Jul-16	ANSC-16-1000	Virginia	Arlington Naval Service Center	2	Gravid Trap CDC John Hoci	Adult	1	Aedes	albopictus		ND	NT	ND	ND	26-Jul-16		PHC-Atlantic	
8-Jun-16	9-Jun-16	AFRH-16-0008	District of Columbia	Armed Forces Retirement Home	2	Gravid Trap CDC John Hoci	Adult	1	Aedes	albopictus		ND	NT	ND	ND			PHC-Atlantic	
15-Jun-16	16-Jun-16	AFRH-16-0017	District of Columbia	Armed Forces Retirement Home	2	Gravid Trap CDC John Hoci	Adult	3	Aedes	albopictus		ND	NT	ND	ND			PHC-Atlantic	
6-Jul-16	7-Jul-16	AFRH-16-0025	District of Columbia	Armed Forces Retirement Home	1	BG Sentinel trap/ Day	Adult	3	Aedes	albopictus		ND	NT	ND	ND			PHC-Atlantic	
6-Jul-16	7-Jul-16	AFRH-16-0030	District of Columbia	Armed Forces Retirement Home	2	BG Sentinel trap/ Day	Adult	5	Aedes	albopictus		ND	NT	ND	ND			PHC-Atlantic	
13-Jul-16	14-Jul-16	AFRH-16-0033	District of Columbia	Armed Forces Retirement Home	2	BG Sentinel trap/ Day	Adult	3	Aedes	albopictus		ND	NT	ND	ND			PHC-Atlantic	
27-Jul-2016	28-Jul-2016	AFRH-16-0041	District of Columbia	Armed Forces Retirement Home	1	BG Sentinel trap/ Day	Adult	1	Aedes	albopictus		ND	NT	ND	ND	4-Aug-2016		PHC-Atlantic	
31-May-16	1-Jun-16	BELV-16-0003	Virginia	Belvoir, Fort	13	Gravid Trap CDC John Hoci	Adult	1	Aedes	albopictus		ND	NT	ND	ND			PHC-Atlantic	
31-May-16	1-Jun-16	BELV-16-0005	Virginia	Belvoir, Fort	21	Gravid Trap CDC John Hoci	Adult	2	Aedes	sp		ND	NT	ND	ND			PHC-Atlantic	
6-Jun-16	7-Jun-16	BELV-16-0014	Virginia	Belvoir, Fort	18	Gravid Trap CDC John Hoci	Adult	1	Aedes	albopictus		ND	NT	ND	ND			PHC-Atlantic	
7-Jun-16	8-Jun-16	BELV-16-0054	Virginia	Belvoir, Fort	11	BG Sentinel trap/ Day	Adult	3	Aedes	albopictus		ND	NT	ND	ND			PHC-Atlantic	
7-Jun-16	8-Jun-16	BELV-16-0055	Virginia	Belvoir, Fort	23	BG Sentinel trap/ Day	Adult	4	Aedes	albopictus		ND	NT	ND	ND			PHC-Atlantic	
7-Jun-16	8-Jun-16	BELV-16-0066	Virginia	Belvoir, Fort	22	BG Sentinel trap/ Day	Adult	2	Aedes	albopictus		ND	NT	ND	ND			PHC-Atlantic	

## RHC Atlantic Yellow=Zika vectors collected

Fort A.P. Hill, VA  
 Aberdeen Proving Ground, Aberdeen, MD  
 Aberdeen Proving Ground, Edgewood, MD  
 Anacostia Annex, DC  
 Arlington Naval Service Center, VA  
 Armed Forces Retirement Home, DC  
 Fort Belvoir, VA  
 Fort Benning, GA  
 Bolling Air Force Base, DC  
 Fort Bragg, NC  
 Fort Buchanan, Puerto Rico  
 Fort Campbell KY  
 Carlisle Barracks, PA  
 Clay National Guard, GA  
 Def. Distr. Depot, Susquehanna PA  
 Defense Supply Center, Columbus, OH  
 Defense Supply Center, Richmond, VA  
 Fort Eustis, VA  
 Guantanamo Bay Naval Base, Cuba  
 Fort Hamilton, NY  
 Henderson Hall Marine Corps Battalion, VA  
 Fort Indiantown Gap, PA  
 Fort Jackson, MS  
 Laurel Bay Military Housing, SC  
 Fort Lee, VA  
 Camp Lejeune, SC  
 Letterkenny Army Weapons Depot, PA  
 Marine Barracks, DC  
 Marine Corps Air Station, Beaufort, SC  
 Marine Corps Recruit Depot, Parris Island, SC  
 Fort McNair, DC  
 Fort Meade, MD  
 Fort Myer, VA  
 Jacksonville Naval Air Station, FL  
 Whiting Field Naval Air Station, FL

Naval Branch Health Clinic, Cherry Point, NC  
 Naval Branch Health Clinic, Gulfport, MS  
 Naval Branch Health Clinic, Meridian MS  
 Naval Branch Health Clinic, Panama City, FL  
 Naval Health Clinic, Annapolis, MD  
 Naval Hospital, Beaufort, SC  
 Naval Hospital, Pensacola, FL  
 Naval Observatory, DC  
 Naval Support Activity, Mechanicsburg PA  
 Naval Support Center, Carderock, MD  
 Navy Research Laboratory, DC  
 Fort Pickett, VA  
 Quantico Marine Corps Base, VA  
 Redstone Arsenal, AL  
 Fort Rucker, AL  
 Fort Stewart, GA  
 Fort Story, VA  
 Walter Reed NMMC, MD  
 Walter Reed, Forest Glen, MD  
 Walter Reed, Glen Haven, MD  
 Washington Navy Yard, DC

47 Army  
 26 Navy  
 3 Air Force

## RHC Central

Camp Bullis, TX  
 Fort Hood, TX  
 Fort Bliss, TX  
 Fort Polk, LA  
 Fort Riley, KS  
 Fort Huachuca, AZ  
 Fort Sill, OK  
 Fort Sam Houston, TX  
 Lackland AFB, TX  
 Randolph AFB, TX  
 Red River Army Depot, TX

## RHC Pacific

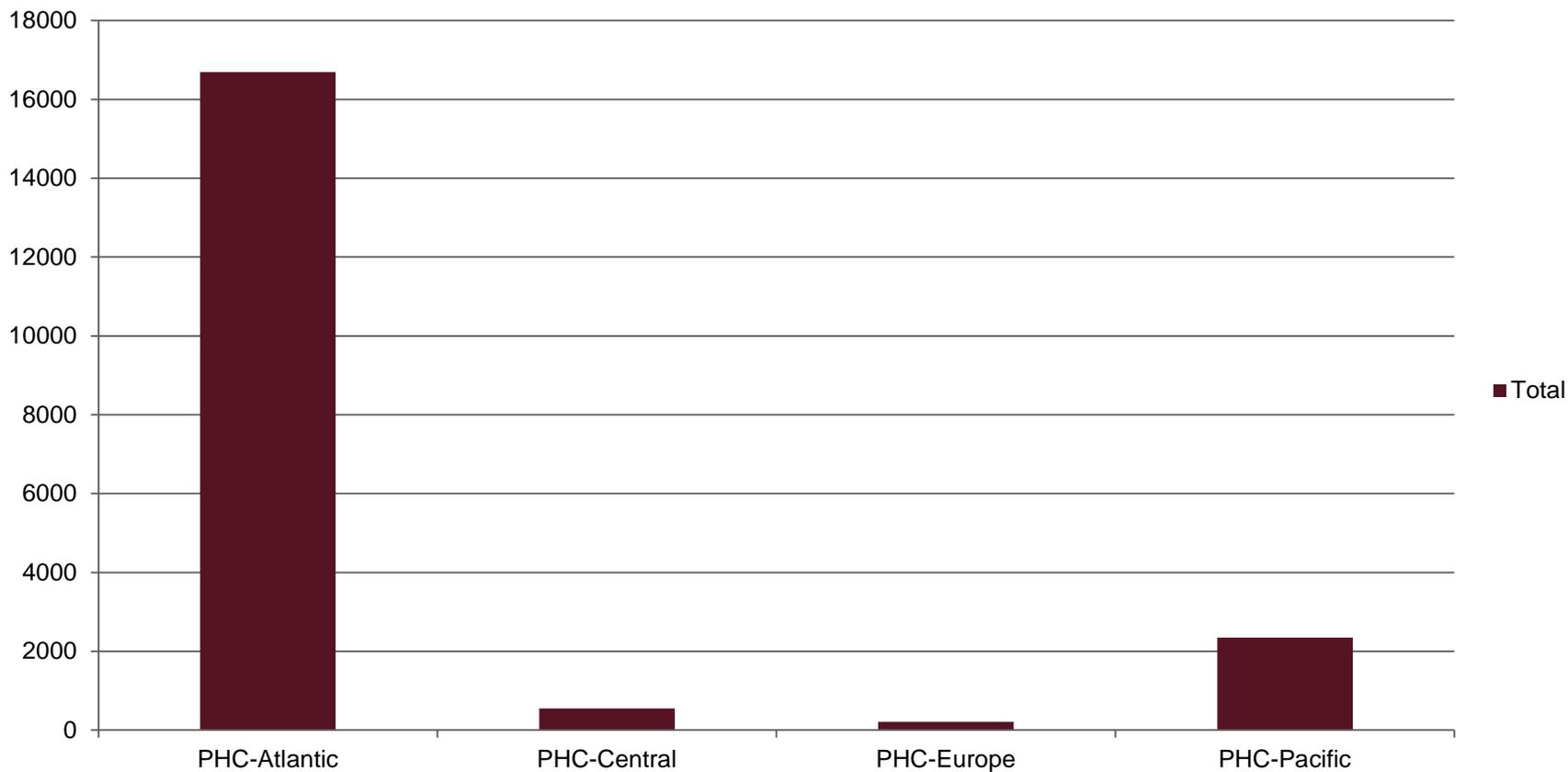
~~Alamamu~~ Military Reservation, HI  
 East Range, HI  
 Fort Shafter, HI  
~~Helemano~~ Military Reservation, HI  
~~Keaukaha~~ Military Reservation, HI  
 Kilauea Military Camp, HI  
 Naval Base Guam  
 Schofield Barracks, HI  
 Tripler Army Medical Center, HI  
 Wheeler Army Airfield, HI

## RHC Europe

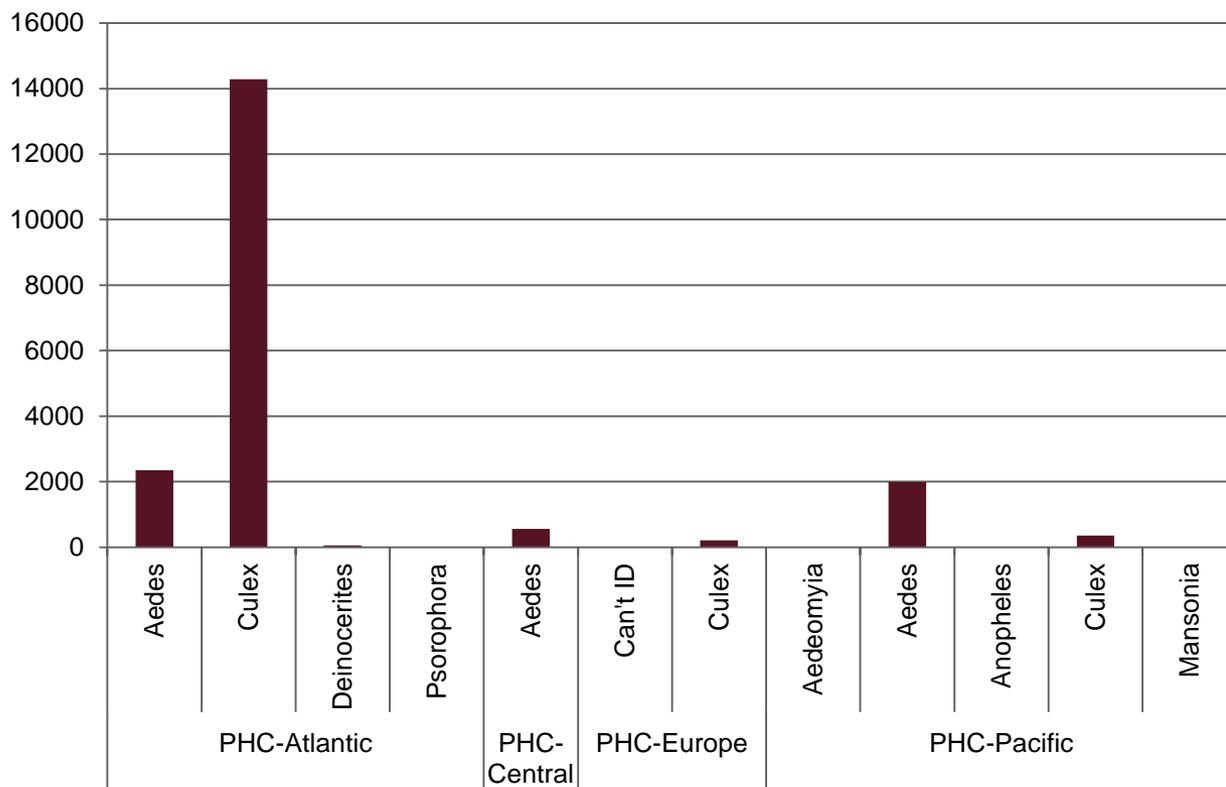
~~Caserma Ederle~~, Italy

□

## Sum of collection data received by Region



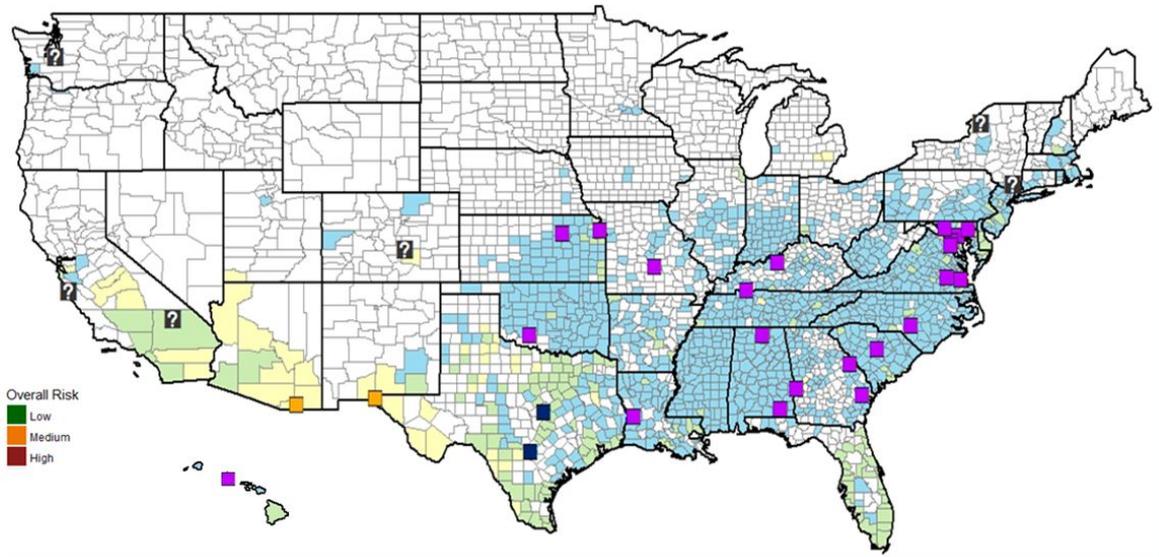
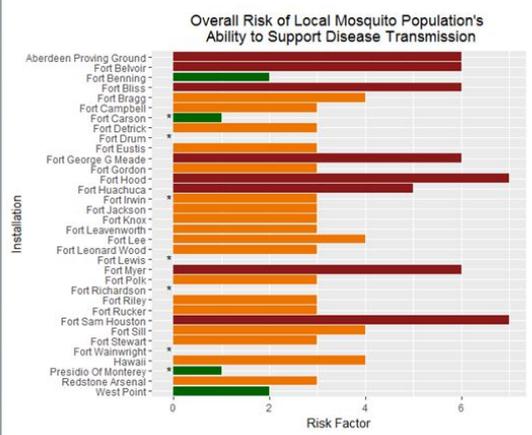
## Total Numbers Submitted to PHC Labs for Testing by Genus



Genus by Region	Total
<b>PHC-Atlantic</b>	<b>16695</b>
Aedes	2351
Culex	14289
Deinocerites	53
Psorophora	2
<b>PHC-Central</b>	<b>553</b>
Aedes	553
<b>PHC-Europe</b>	<b>210</b>
Can't ID	5
Culex	205
<b>PHC-Pacific</b>	<b>2349</b>
Aedeomyia	1
Aedes	1992
Anopheles	3
Culex	352
Mansonia	1
<b>Grand Total</b>	<b>19807</b>

# 2016 PHC Mosquito Surveillance Data

Mosquito Distributions Reported by County		Collected Mosquito Species	
Yellow fever mosquito	Asian tiger mosquito	Yellow fever mosquito	Asian tiger mosquito
Both mosquito species	Neither Reported	Both mosquito species	No Data



\* May represent an underestimation of risk due to lack of data.

- Contingency/Defense Support to Civil Authorities operations
- Responsibility of “line” units that fall under Forces Command
- These Medical Detachments are housed on installations but are NOT responsible for any surveillance activities while on “home station”
  - Mission is to be prepared to deploy
  - May provide assistance in garrison to keep soldiers trained
- While deployed they are responsible for all surveillance and control activities on basecamps
  - Deployments may be overseas or in support of Joint Task Forces, e.g JTF-Katrina
- Data not captured externally for archival—HUGE GAP

- Interagency partnership with National Museum of Natural History, Smithsonian Institution
  - Identification resources
    - Traditional taxonomic tools
    - Molecular tools
  - Bionomic information
  - Mapping and modeling
    - Vector Hazard Reports
    - Surveillance data management
- Services provided to the DoD and partners with others through the Smithsonian
  - NEON: National Ecological Observation Network

- Rather disjointed entomological surveillance efforts
  - R&D community—detailed surveillance but limited to projects
  - Installation surveillance and control may or may not intersect
  - Operational surveillance often not captured
- During outbreak, Army would conduct surveillance on installations, may provide technical support through deployment of a MED DET but role is generally to cover down on areas occupied by troops
- Bottom line: We could probably benefit more from leveraging you than you leveraging us
  - R&D community could provide backdrop:
    - Utilize VectorMap to combine Army data with State/local data
    - Field Data Submission system?

# Questions?

# Collaborating with Mosquito Control Districts

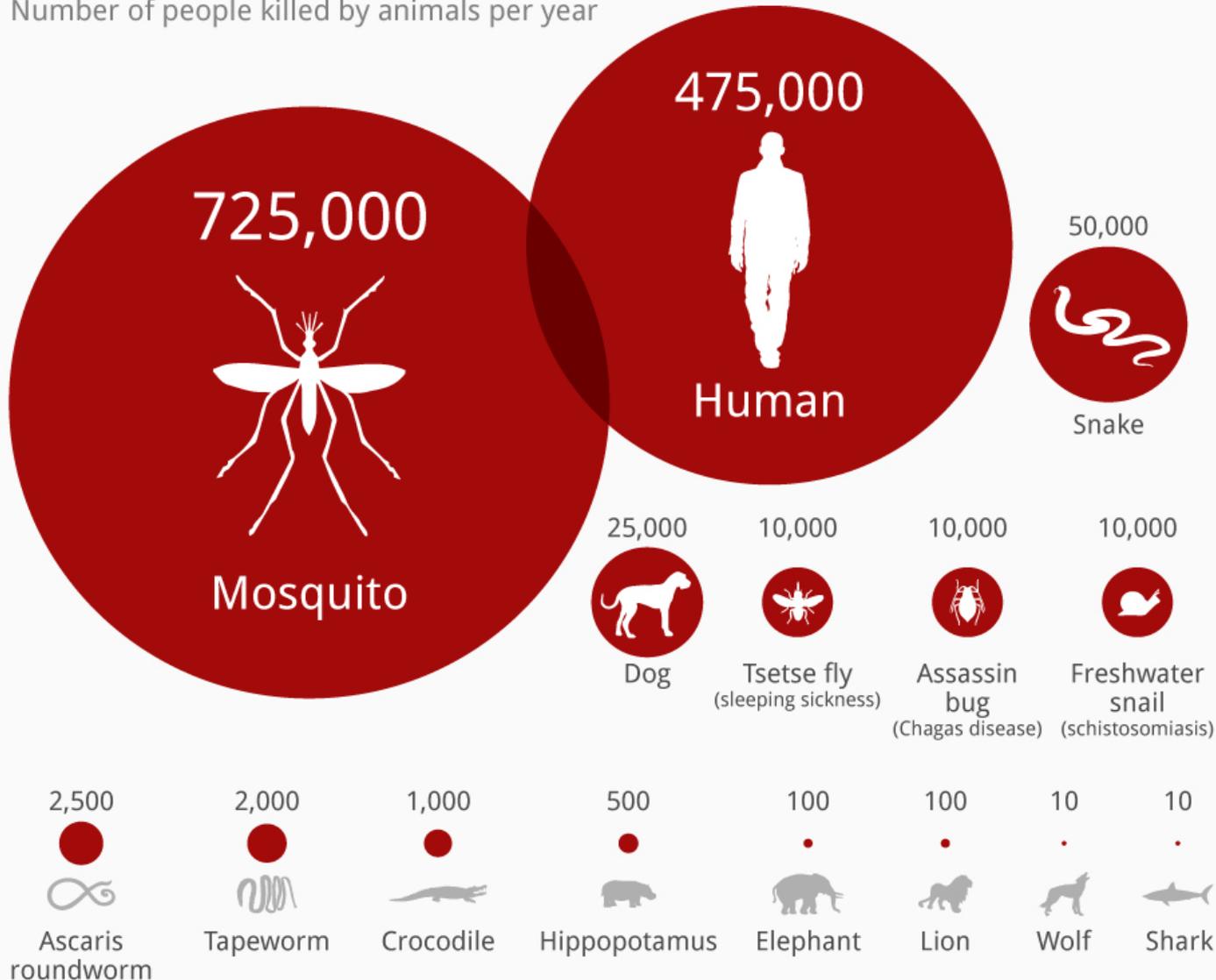


Ary Faraji, PhD  
“Expanding Surveillance Related to Zika Virus”  
Council of State and Territorial Epidemiologists  
7 February 2018

# Mosquitoes are Deadly

## The World's Deadliest Animals

Number of people killed by animals per year

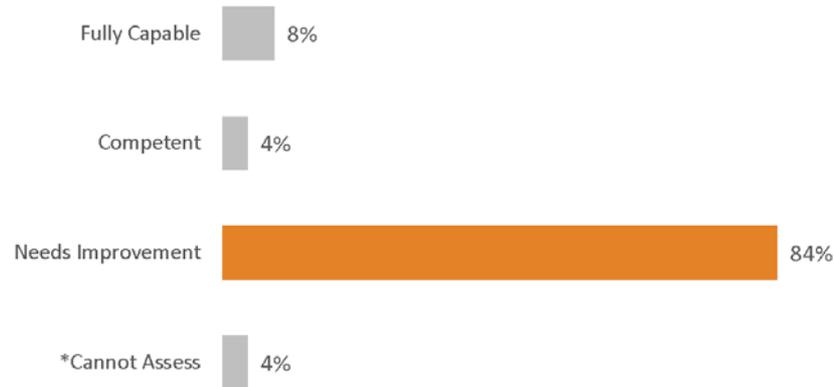


# Mosquito Control Capabilities in the U.S.

## NACCHO - October 2017

The overwhelming majority of vector control programs are in need of improvement

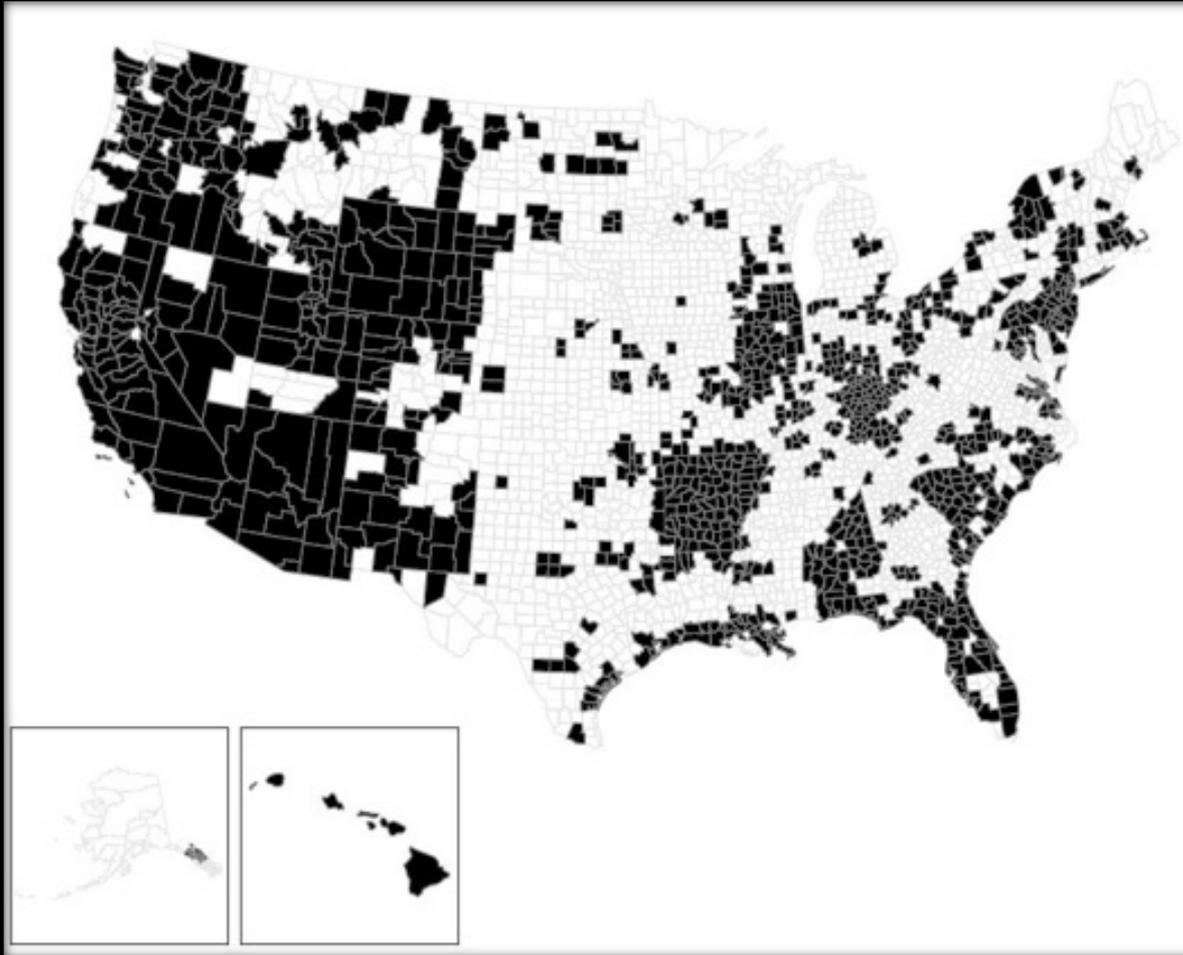
Percentage of vector control programs



n = 1083

**NACCHO**  
National Association of County & City Health Officials

# US Mosquito Control Programs



Independent taxing districts

County/City/Parish  
(Health Dept)

Decentralized  
(DOT/DPW)

Private

>950 (\$400 mil) Government MCP's

FL >60 (~\$165 mil); CA >80 (~\$75 mil); LA 25 (~\$35 mil); NJ 21 (~\$12 mil)



# MOSQUITO CONTROL

Two Basic Types of Government Programs:

Dependent

Independent

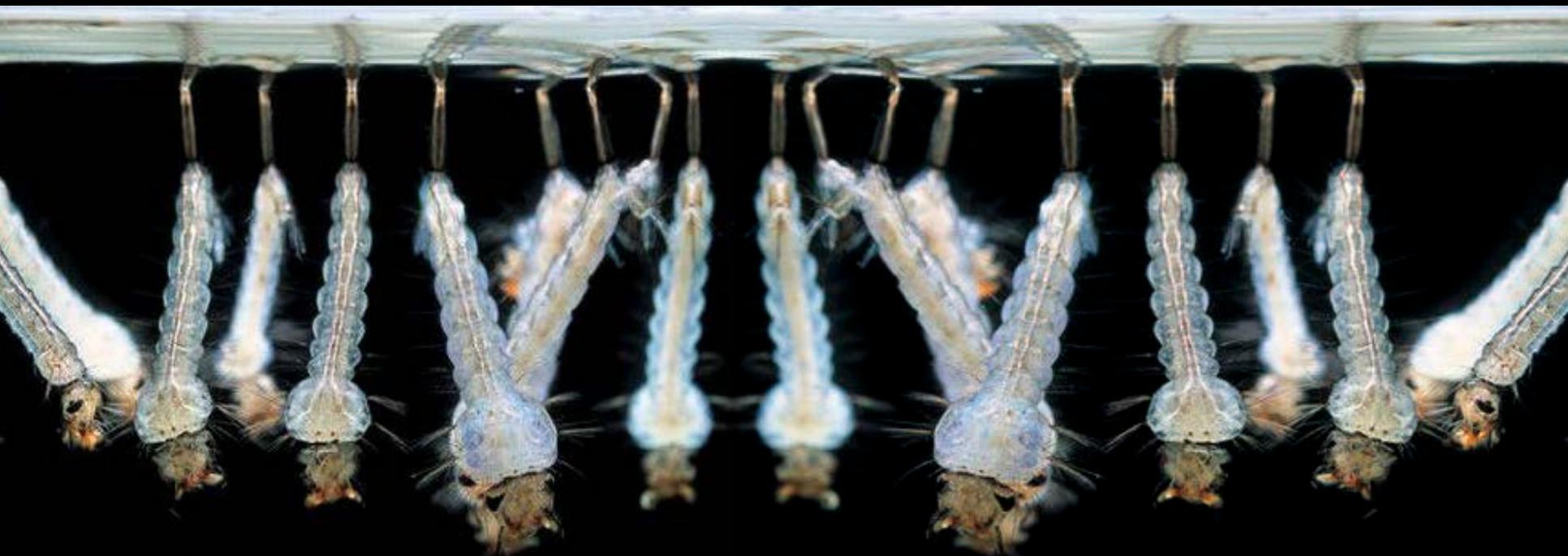
# Integrated Mosquito Management (IMM)

Comprehensive preventive/control strategy

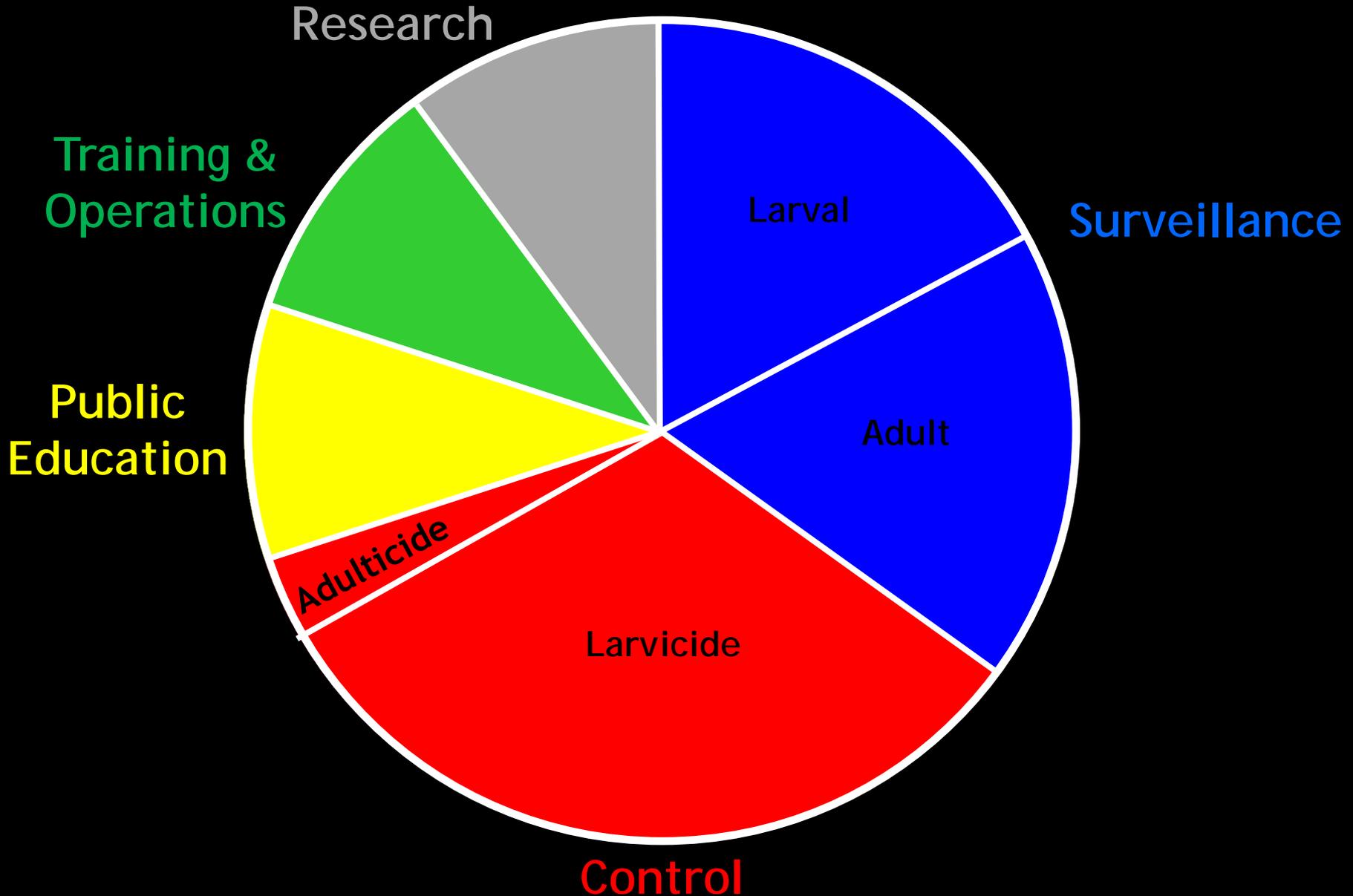
Knowledge based (bio/ecology of pests)

Surveillance (SCIENCE) driven

Resource (\$) & environmentally dictated



# Integrated Mosquito Management





**John B. Smith**

**(1912 bill signed by NJ Governor Woodrow Wilson)**







Urban Jungle



# Suburban Jungle





*Aedes aegypti*  
(Yellow Fever Mosquito)

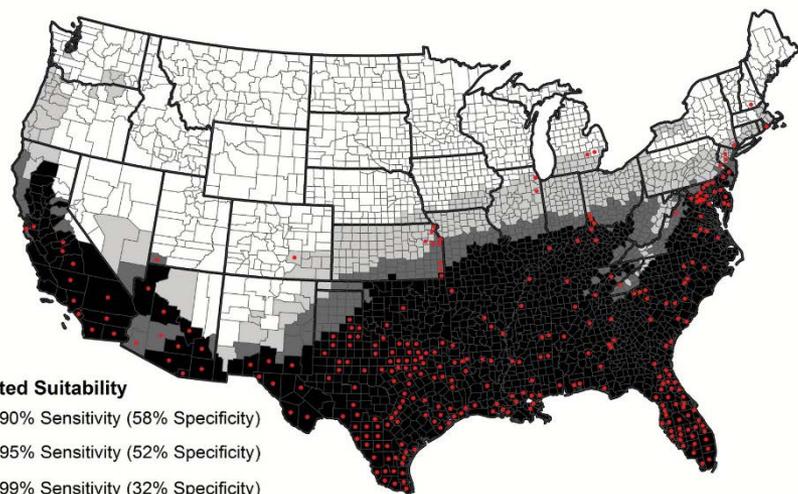


*Aedes albopictus*  
(Asian Tiger Mosquito)

**“Invasive *Aedes*”**

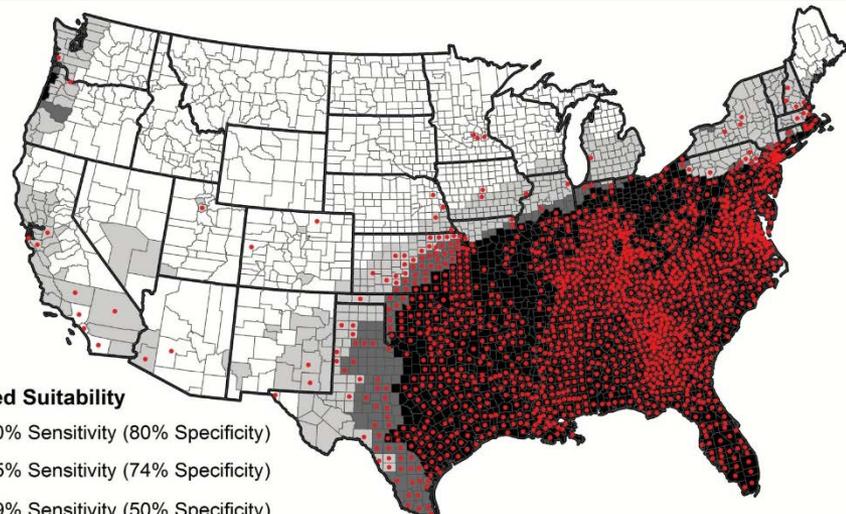


**Global Climate Change**



**Predicted Suitability**

- 90% Sensitivity (58% Specificity)
- 95% Sensitivity (52% Specificity)
- 99% Sensitivity (32% Specificity)
- Unsuitable
- Presence Point



**Predicted Suitability**

- 90% Sensitivity (80% Specificity)
- 95% Sensitivity (74% Specificity)
- 99% Sensitivity (50% Specificity)
- Unsuitable
- Presence Point

0 375 750 1,500 km

*Ae. aegypti*

*Ae. albopictus*

# The New York Times

HEALTH

## *Zika Virus Case in Utah Baffles Health Officials*

By SABRINA TAVERNISE JULY 18, 2016



Health > Diet + Fitness | Living Well | Parenting + Family

Live TV

U.S. Edition +



## Utah resident is first Zika-related death in continental U.S.

By Debra Goldschmidt, CNN

Updated 7:40 PM ET, Fri July 8, 2016



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July 29, 2016

The New York Times

NYTimes.com »

# Breaking News Alert

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## BREAKING NEWS

# Four cases of Zika in Miami appear to be the result of local mosquito transmission — the first such cases in the continental U.S.

Friday, July 29, 2016 10:23 AM EDT

Officials believe that the area of active transmission is limited to a one-square mile area just north of downtown Miami. No mosquitoes tested have been found to be carrying the Zika virus, and the department is going door to door in the neighborhood collecting urine samples to test residents.

Miami-Dade County is one of the biggest ports of entry into the United States from countries where the Zika virus is circulating, and experts have long described it as one of the areas most at risk for the spread of the disease.

# The Coming Arbovirus Storm and Invasive Species

Pandemics more frequent...

Other insects and vectors...



Yellow Fever, Dengue, Japanese Encephalitis, St. Louis Encephalitis, Powassan Virus, Rift Valley Fever, Usutu, Mayaro, O'nyong-nyong, Venezuelan Equine Encephalitis, Bwamba, Sindbis, Barmah Forest, Semliki Forest, Ross River, Rocio, Spondweni, Ilheus...

# Mosquito Control Needs

A person wearing a protective suit and helmet is riding a utility vehicle, possibly a tractor or similar, in a field. The vehicle has a large container on the back. The background shows a cloudy sky and distant hills.

COMMUNICATION!!!

Building Capacity: Train Next Gen Epis/Entos

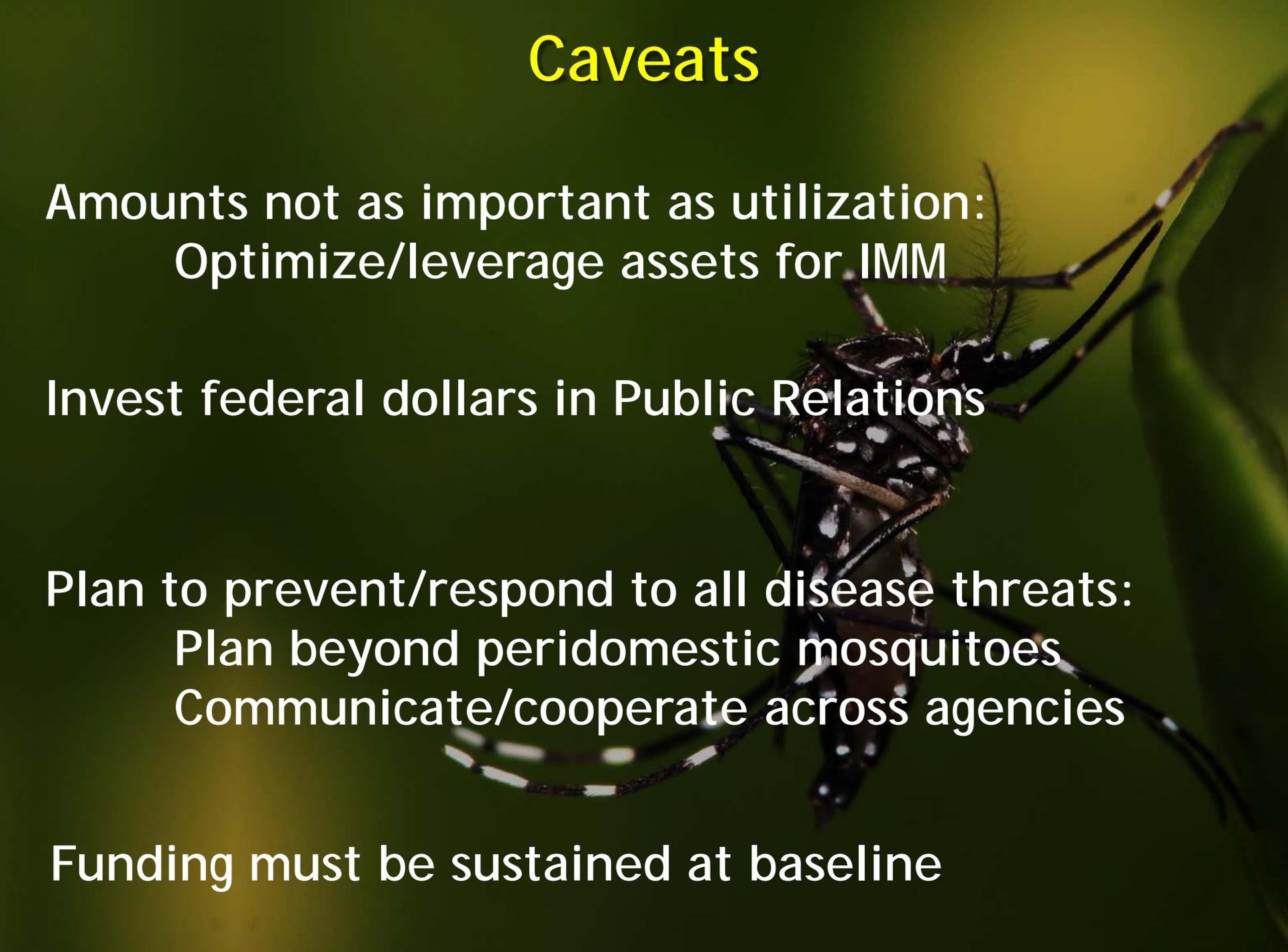
Leadership/Coordination: Proactive Planning  
Beyond Zika, Building Partnerships (PCO, Industry,  
Public Health), Coordination of Surveys/Responses,  
State Med Ents

Public Education Initiatives (Make Mosquitoes  
Homeless)

New and Existing Tools

Generate/Facilitate Grants and Federal Funding

# Caveats



Amounts not as important as utilization:  
Optimize/leverage assets for IMM

Invest federal dollars in Public Relations

Plan to prevent/respond to all disease threats:  
Plan beyond peridomestic mosquitoes  
Communicate/cooperate across agencies

Funding must be sustained at baseline



**BEST PRACTICES FOR INTEGRATED MOSQUITO MANAGEMENT:  
A FOCUSED UPDATE**

*American Mosquito Control Association*  
January 2017



[www.mosquito.org](http://www.mosquito.org)

Module 1: Mosquitoes and Disease: Aedes and Culex; **AVAILABLE!**

Module 2: What and Why of Aedes Species Ecology and Behavior; **AVAILABLE!**

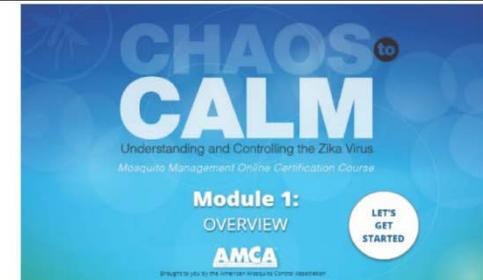
Module 3: The What and How of Aedes Surveillance;  
**NOW AVAILABLE!**

Module 4: The What and How of Aedes Control;  
*Coming soon.*

To successfully complete the assessment scores need to be 85% or higher to advance to the next module. Upon successful completion of all four modules participants will receive a certificate of completion.

The e-modules serve as an onsite supplement and complement the onsite Train the Trainer workshop hubs.

**E-Modules are not just for those in the AMCA Train the Trainer program. All individuals within the mosquito and vector control industry can benefit from the online training! The online training is available for free for both members and non-members.**



# CDC Vector-Borne Disease Regional Centers of Excellence

The purpose of this Funding Opportunity Announcement (FOA) is to (1) build effective collaboration between academic communities and public health organizations at federal, state, and local levels for surveillance, prevention, and response; (2) train public health entomologists in the knowledge and skills required to address vector-borne disease concerns, and (3) conduct applied research to develop and validate effective prevention and control tools and methods and to anticipate and respond to disease outbreaks. The Centers of Excellence (COEs) to be supported by this FOA will provide regional capacity to enhance public health prevention and response for vector-borne diseases, pushing technology closer to sites of potential transmission.

# CDC Vector-Borne Disease Regional Centers of Excellence



**Western Gulf Center of Excellence for Vector-Borne Diseases**

Lead Institution: Institute for Human Infections & Immunity, UTMB Health  
PI: Scott C. Weaver, MS, PhD

Partners and Associated Institutions:

**ACADEMIC PARTNERS**

- Texas A&M University
- Texas A&M AgriLife Research
- Texas A&M AgriLife Extension
- The University of Texas Rio Grande Valley
- The University of Texas at El Paso
- The University of Texas at Austin
- Vanderbilt University
- University of Colorado
- University of Houston



- Texas A&M AgriLife
- Texas A&M Engineering Experiment Station
- UT - Rio Grande Valley
- UT - El Paso
- UT - Austin
- UTM - El Paso
- Vanderbilt University
- University of Colorado
- University of Houston

**LOCAL PUBLIC HEALTH AGENCIES**

- Harris County Public Health (Houston)
- Dallas Public Health
- McAllen Public Health
- Hidalgo County Public Health
- Brownsville Public Health
- Cameron County Public Health
- Galveston County Health Department

**STATE PUBLIC HEALTH AGENCY**

- Texas Department of State Health Service

## Pacific Southwest Center of Excellence in Vector-Borne Diseases



### About the Center

California's large population and location on the Pacific Rim make it a hub for commerce and travel, with some of the busiest North American airports, seaports, and highways. California also includes diverse ecological landscapes ranging from cool temperate forests to dry, hot deserts, making the state highly susceptible to invasive vectors, exotic pathogens such as Zika virus, and several endemic pathogens transmitted by mosquitoes and ticks. The Pacific Southwest Regional Center of Excellence in Vector-Borne Diseases addresses these urgent public health challenges. UC Davis and UC Riverside will combine cutting-edge research in surveillance, vector control, genetics, epidemiology, and sustainable, effective insecticide development to generate knowledge and technology to prevent the spread of vector-borne



**Public Health: Awareness and Vector Control**

"University of Miami researchers are tracking breeding grounds for mosquitoes and analyzing transmission rates and control programs." [Read more here.](#)

What you should know about the Zika virus and its effects.

—University of Miami News

[VIEW DETAILS](#)

### The Upper Midwestern Center of Excellence for Vector-Borne Disease

Susan, Paskewitz M.  
University of Wisconsin Madison, Madison, WI, United States

Abstract

This proposal details establishment of the Upper Midwestern Center of Excellence in Vector Borne Diseases (MCE-VBD) in response to CDC RFA-CK-17-005. The MCE-VBD includes accomplished and enthusiastic partners from academic, public health, and vector control institutions in Wisconsin, Minnesota, Illinois, Michigan and Iowa. The broad and long term goal of the Center is to incentivize new and expanded interactions between experts in the region so that responses to endemic and epidemic vector borne disease are improved and accelerated. To achieve this goal, the project is focused on three major objectives: 1) Increase the opportunities for training in public health entomology (PHE) for current practitioners and students. This objective will be achieved through graduate student training in PHE and through administration of a new Certificate of PHE, with a curriculum including workshops and short courses in vector identification, surveillance and control methods, pesticide application licensure and a la carte course options to be tailored to graduate level study including VBD diagnostics, model interpretation and translation, project management, and quality control. 2) Build a community of practice including public health and mosquito control experts at the county and district/municipal level, state public health experts, and academic scientists at research institution in each state. This goal will be achieved by establishing processes for information sharing between partners, developing evidence-based and region-specific public health messages, interacting to establish best practices for VBD and outbreak management, and standardizing region-wide surveillance for invasive vectors like *Aedes albopictus* and *I. scapularis*. This work will be facilitated through a public health advisory board, and will be amply supported so that the burden of new effort does not fall to PH. 3) Research to improve surveillance and responses to VBDs. For this aim, we will develop methods to improve predictions of disease emergence and outbreaks



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## Northeast Regional Center for Excellence in Vector-Borne Diseases



Animal Health Human Health  
One  
Health  
Ecosystem Health

# The Invasive Mosquito Project: Using Citizen Scientists to Expand Public Health Surveillance Capacities

Lee Cohnstaedt  
Council of State and Territorial  
Epidemiologists  
February 2018



[www.citizenscience.us](http://www.citizenscience.us)



IMP on ABC



# Invasive Mosquito Project

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**Thackrah et al. 2016**  
**The Invasive Mosquito Project:**  
**A public education tool.**  
**Wingbeats Spring 27:23-24**

Cohnstaedt et al. 2016  
Collecting mosquito distribution  
data from eggs as a citizen  
science research project.

*The American Biology Teacher*  
78:317-322  
doi.org/10.1525/abt.2016.78.4.317



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# Invasive Mosquito Project



- Targeted at high school classes
- Students collect mosquito data around their homes
- Teach about public health and safety, mosquito transmitted illnesses, and the individuals role in safety
- Partner teachers with mosquito control, public health professionals, or biologists



# Is the data useful?

Analysis by Sara Paull, work supported by NASA under IGES award No. NNX17AG60A.

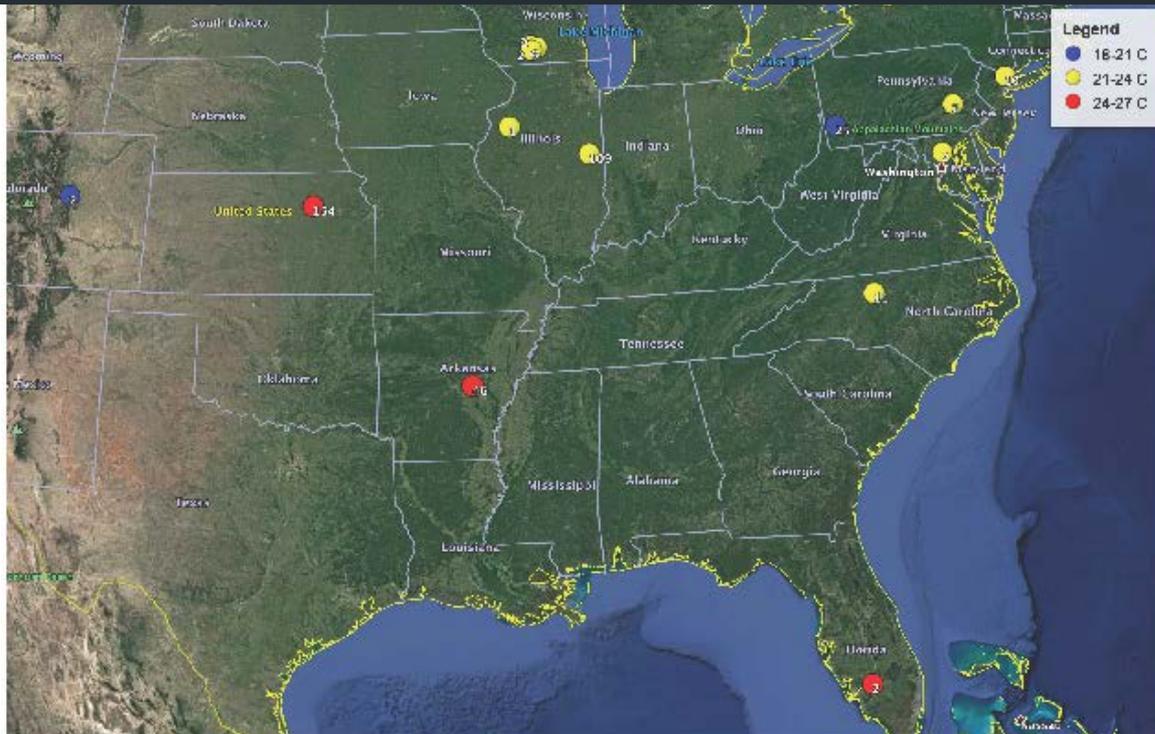


Fig. 1. Location of oviposition trap data sources. Colors represent the mean temperature during the collecting period, while numbers give the total number of samples submitted from each location.

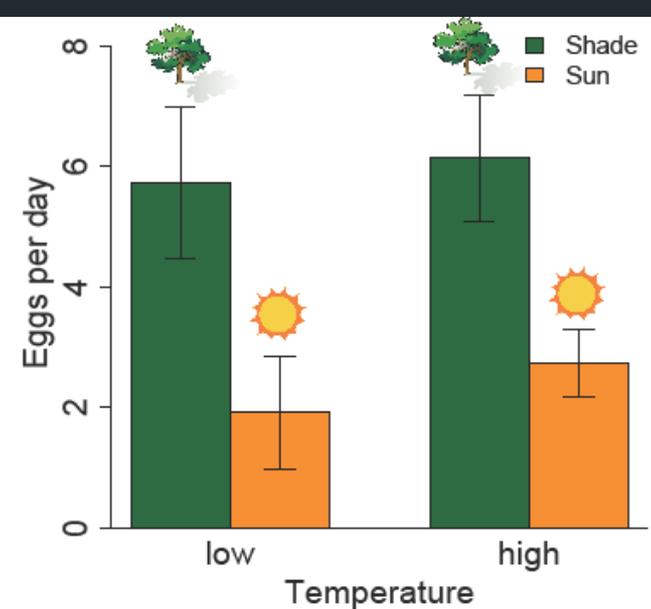


Fig. 2. Mean  $\pm$  SE of eggs laid per day in ovi-traps that were placed in the sun (green) or shade (orange). Low temperatures were below the median collection period temperature of 25°C, high were above.

- Analysis of the egg data from 2016
- Regardless of latitude and temperature, statistically more eggs were laid in the shade vs the sun.

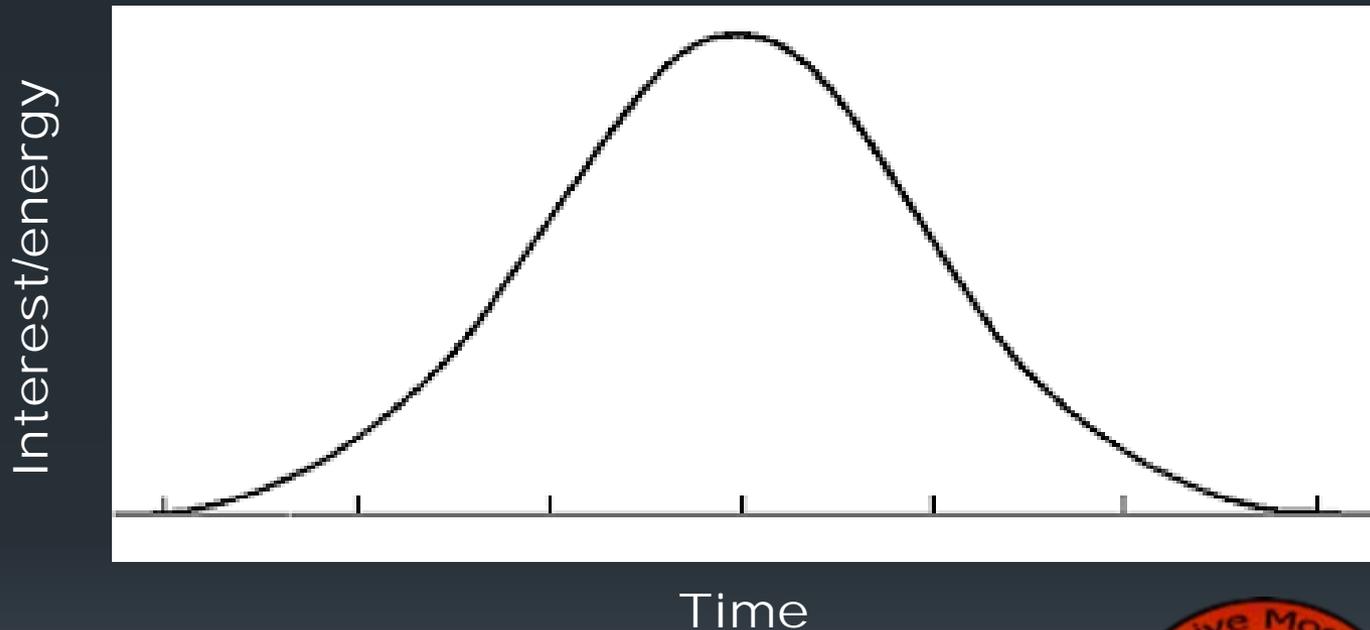
# What makes the IMP different?



- Overworked and underpaid. Who needs one more thing to do?
- My challenge to you, contact your local schools and recruit the best high school student to run the project in your area.
- Since 2014, the program has sent 5 students to college on full ride scholarships.
- We are trying to expand this aspect of the program and think it will help you get a highly motivated worker to help with your public health surveillance and recruit the next generation of scientists.

# Recruitment, reward, retain

The challenges of recruiting, retaining, and rewarding collaborators.



Cohnstaedt et al 2016. Crowdsourcing methodology: Establishing the Cervid Disease Network and the North American Mosquito Project

*Veterinaria Italiana* **52**:195-200.  
doi: 10.12834/VetIt.577.2765.2



# Long-term plans for the IMP

- 20/20 plan
  - Long-term data set of yearly mosquito distributions
  - Detect invasive species/changing habitats
- Keep “public” in public health with active participation
  - Define the individual’s role in mosquito control
  - Help people determine their risks
  - Support mosquito control districts with a unified national education plan for community engagement and education
  - Recruit the next generation of scientists/entomologists



Invasive.Mosquito.Project@gmail.com

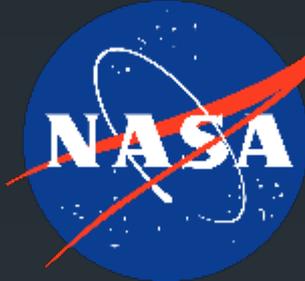
www.citizenscience.us



**Maki and Cohnstaedt 2015.**

**Crowdsourcing for large-scale mosquito (Diptera: Culicidae) sampling.**

*Canadian Entomologist*. 147: 118-123  
doi.org/10.4039/tce.2014.27



**Cohnstaedt et al 2016.**

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Unidad de Control de  
Vectores de Puerto Rico

**K-STATE**

**Cohnstaedt et al. 2016**

**Collecting mosquito distribution data from eggs as a citizen science research project.**

*American Biology Teacher* 2016 78: 317–322

**clarke**



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