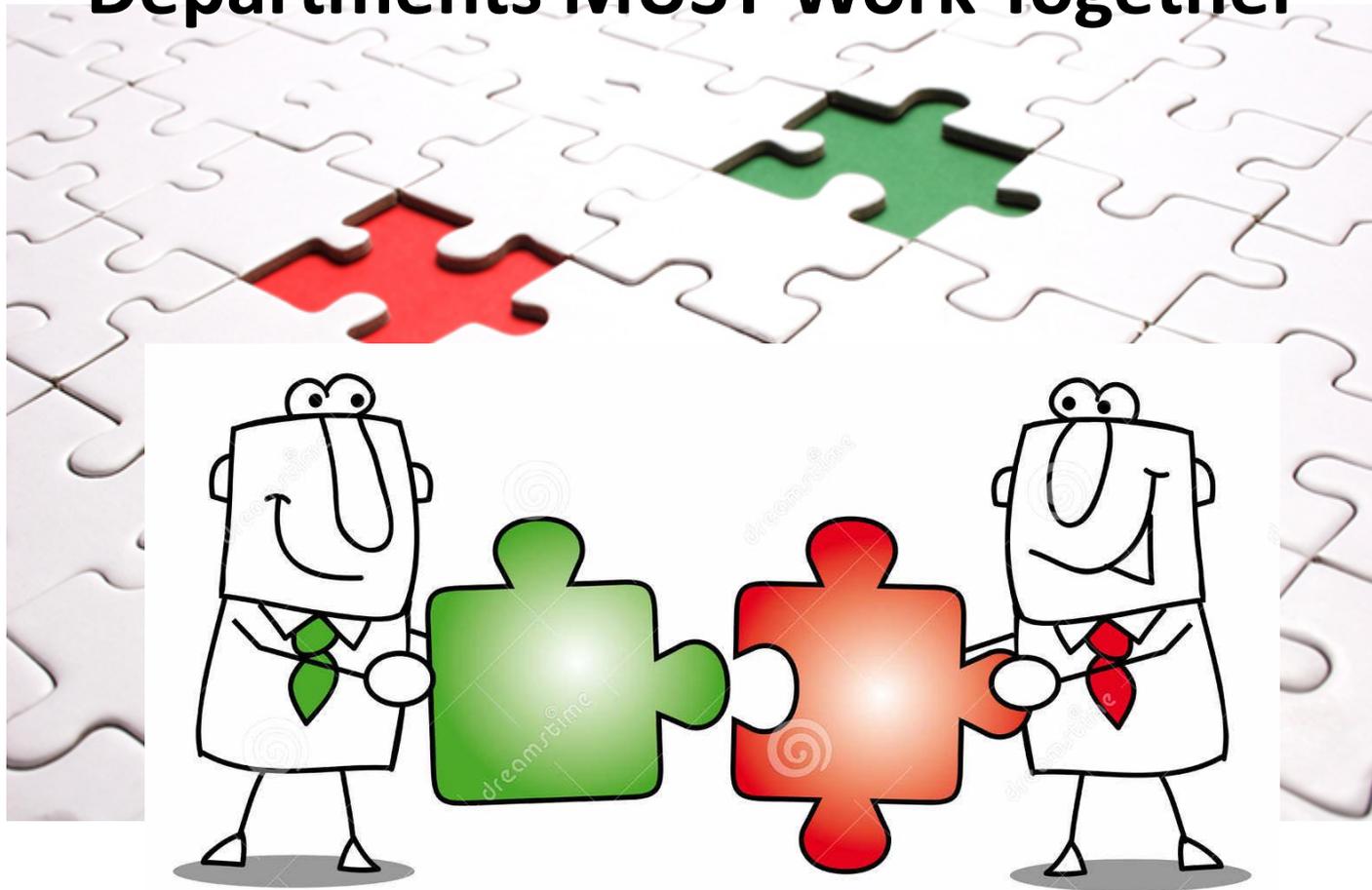


CHIK, 2014

Why Mosquito Control and Health Departments **MUST** Work Together



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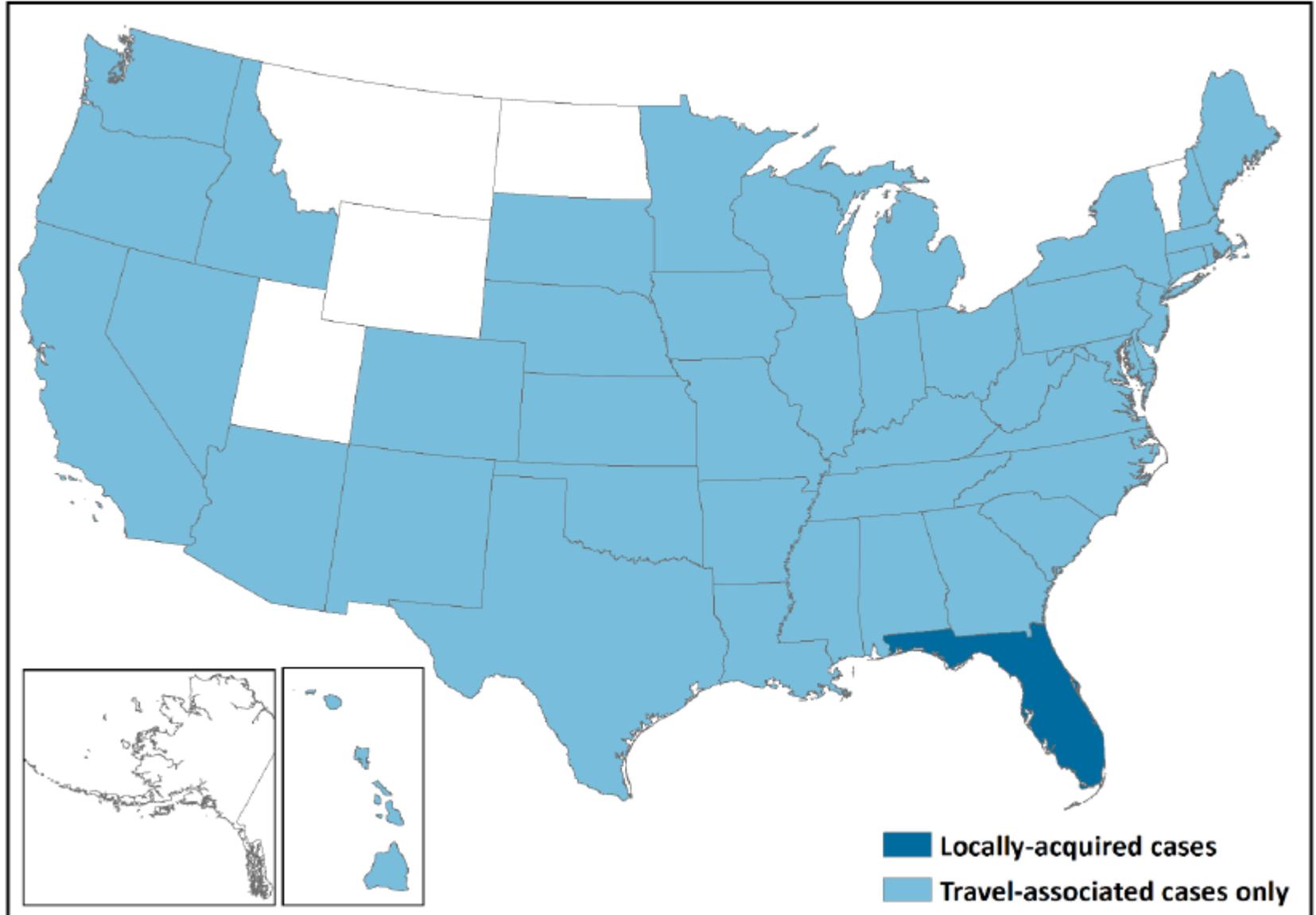
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Figure 1. Chikungunya virus disease cases reported by state – United States, 2014 (as of September 16, 2014)



Symptoms

- Symptoms include:

- Sudden onset of high fever
- Headache
- Back pain
- Myalgia (muscle pain)
- Arthralgia (joint pain)



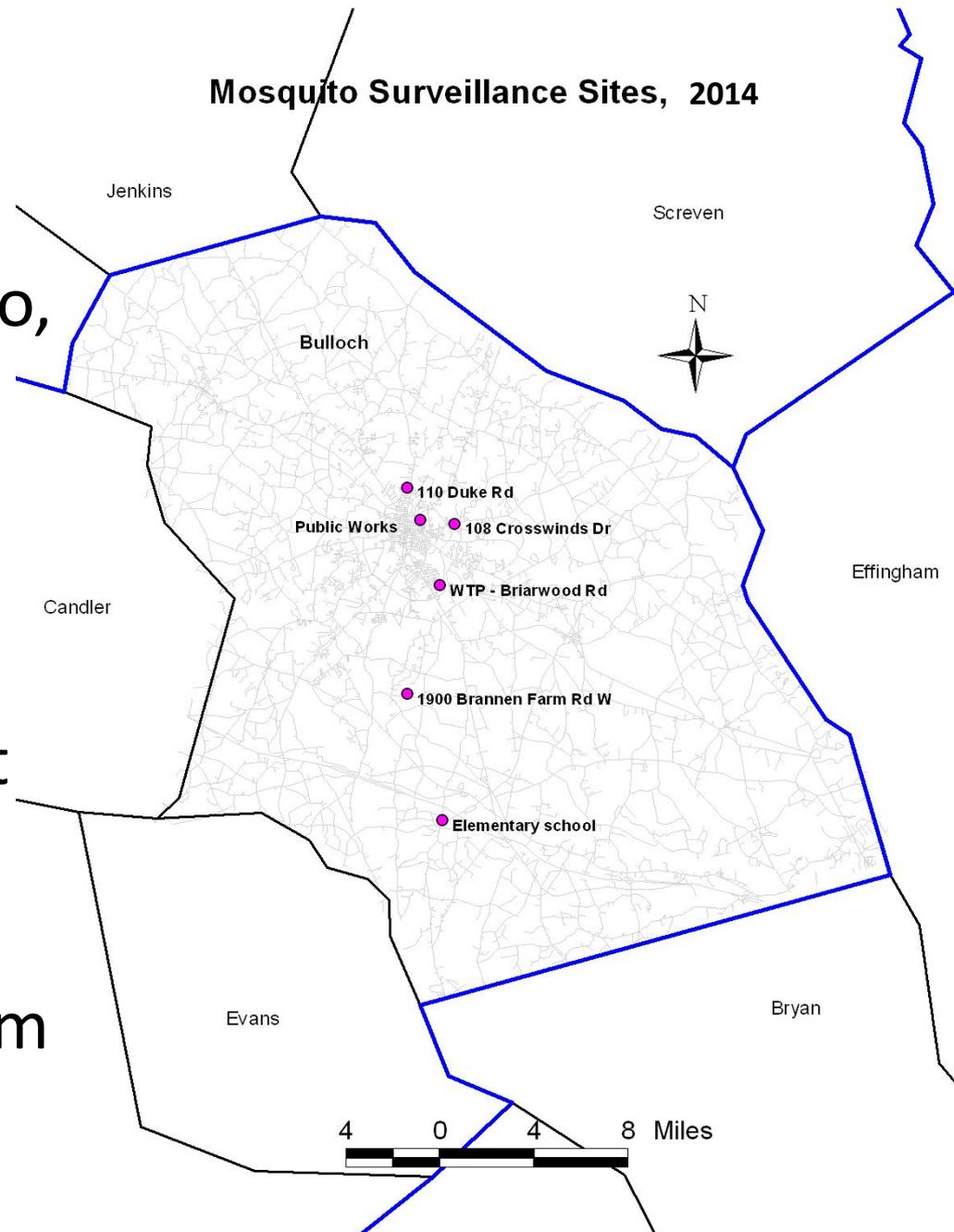
- Clinical laboratory findings can include:

- Lymphopenia (low lymphocyte levels in blood)
- Thrombocytopenia (low blood platelet count)
- Elevated creatinine (associated with kidney function)
- Elevated hepatic transaminases (associated with liver damage)

- The symptoms appear on average 3-7 days (range is 1-12 days) after being bitten by an infected *Aedes* mosquito
- Acute symptoms typically resolve within 7–10 days

July 15, 2014

- Location: Statesboro, GA
- Activity: monthly mosquito surveillance by GDPH entomologist as part of the arbovirus surveillance program



July 15, 2014

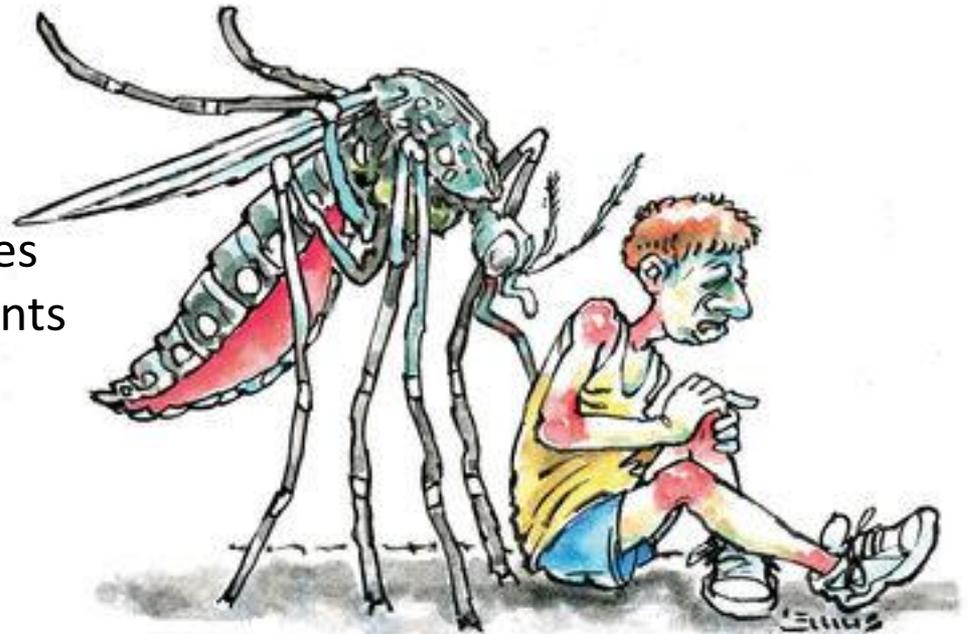
- Temperature: low 90s
- Sunny, mostly still, high humidity
- Heavy rainfall occurs during trap setting and temperatures drop to the low 70s



July 15, 2014

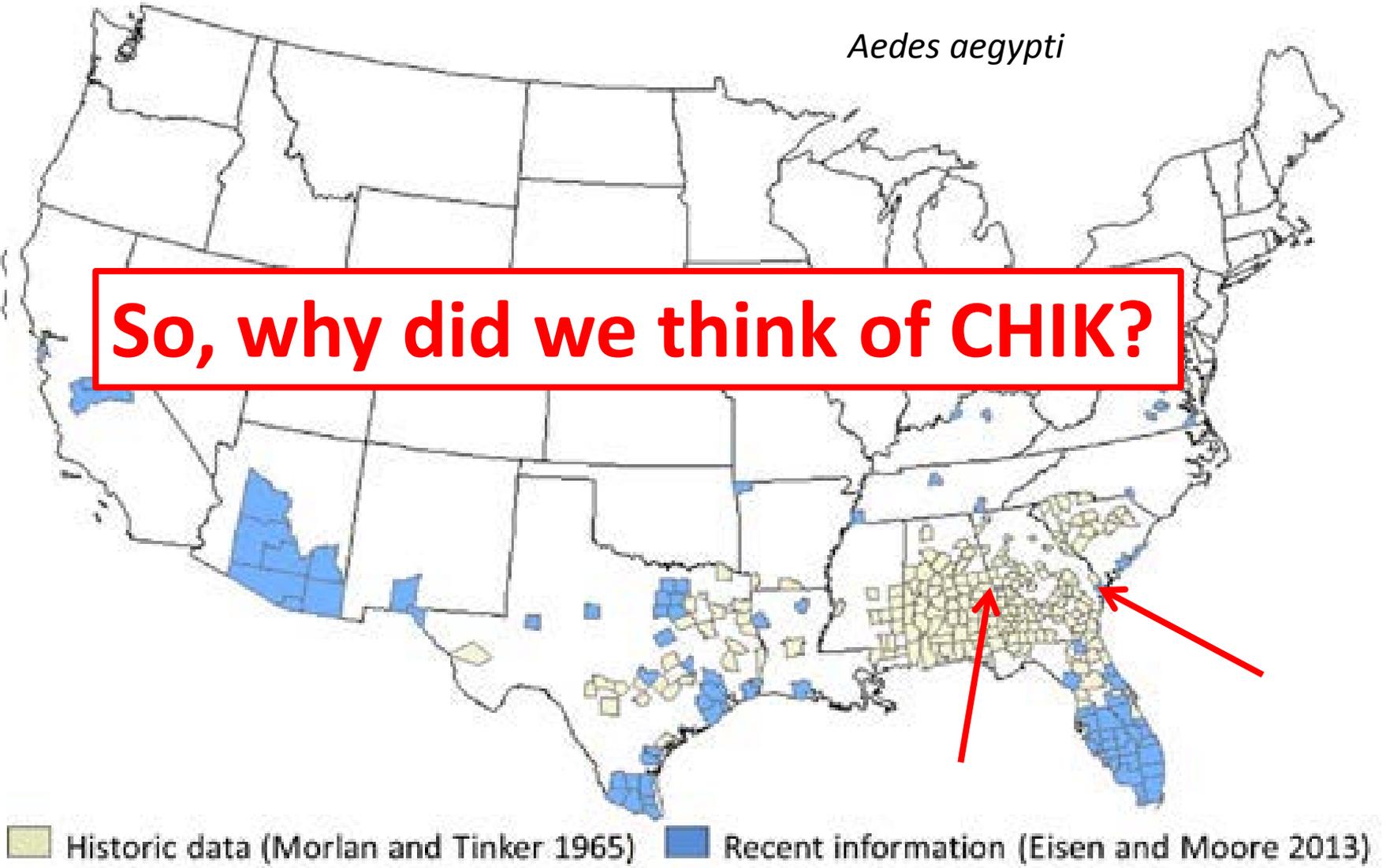
(Day 11 Post Onset)

- At COB - received a call from Robert Seamans, Public Works Superintendent of Streets & Parks
 - Employee at the Public Works office downtown had been hospitalized with an unknown illness
 - Doctors suspected an arboviral disease
 - High fever (105°)
 - Joint pain
 - Nausea and vomiting
 - Low WBC count
 - Abnormal liver enzymes
 - Abnormal platelet counts
 - Onset July 4th
 - No travel history



Aedes aegypti

So, why did we think of CHIK?

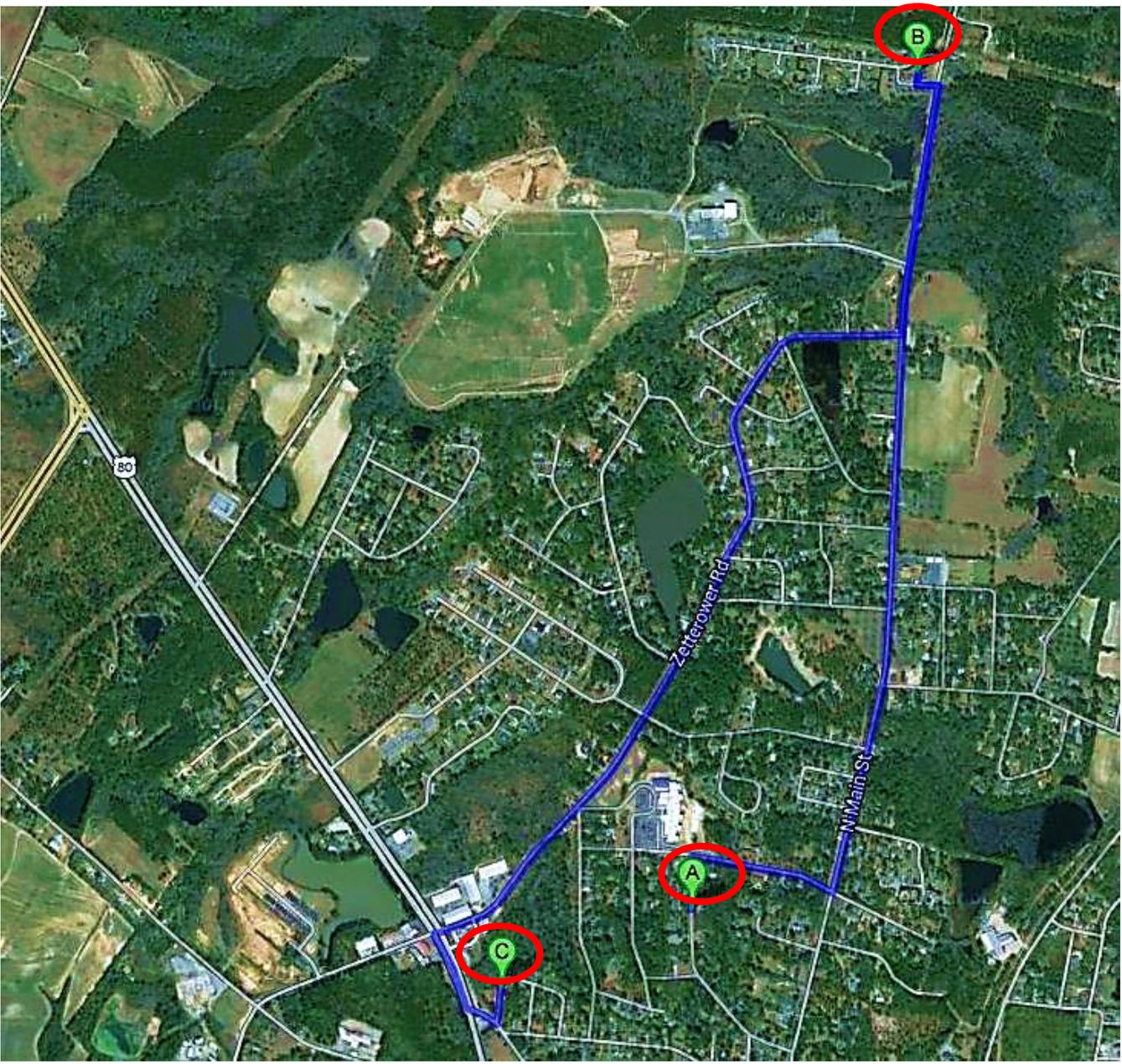


Day 11 Post Onset (continued)

- Background information
 - 2 travel-associated CHIK cases in same general area, one within $\frac{1}{4}$ mile
 - *Aedes albopictus*, a competent vector, is common in the area
 - The case symptoms were compatible with CHIK
 - The timing worked



Case Area



Day 12 Post Onset

- Temp: mid 70s and increasing
- Muggy, overcast, mostly still
- Sun came out later

Traps were picked up.

The most common mosquito collected was *Culex quinquefasciatus* (WNV vector). *Aedes albopictus* numbers were low.

The case site was not part of the surveillance.

Species	trap type	
	CDC	Gravid
<i>Aedes albopictus</i>		10
<i>Ae. vexans</i>	6	
<i>Anopheles crucians</i>	2	
<i>An. quadrimaculatus</i>	5	
<i>Culex erraticus</i>	17	1
<i>Cx. nigripalpus</i>	1	
<i>Cx. quinquefasciatus</i>	2	135
<i>Cx. salinarius</i>	1	
<i>Ochlerotatus atlanticus</i>	1	
<i>Psorophora columbiae</i>	1	
<i>Toxorhynchites rutilus</i>		1
Grand Total	36	147

However...

Historically, *Aedes albopictus* numbers are high in Statesboro, making this one of the most common pest species in the area.

species	2010	2011	2012	2013	2014	Grand Total
<i>Ae. vexans</i>	4.0	256.0	141.7	12.5	11.5	425.7
<i>Cx. quinquefasciatus</i>	46.0	59.0	89.0	130.0	75.0	399.0
<i>Cx. salinarius</i>		6.0	13.0	334.5	0.5	354.0
<i>Cx. erraticus</i>	148.0	42.0	27.3	104.5	21.0	342.8
<i>Ae. albopictus</i>	20.0	96.0	39.0	82.0	51.0	288.0
<i>Cx. nigripalpus</i>			232.3	32.0	0.5	264.8
<i>Ps. columbiae</i>	2.0	55.0	4.3	113.5	8.0	182.8
<i>An. crucians</i>	1.0	4.0	11.3	90.0	3.0	109.3
<i>Oc. atlanticus</i>			3.3	69.5	1.0	73.8
<i>Cq. perturbans</i>	9.0	45.0	1.7	3.0		58.7
<i>Ps. ferox</i>	2.0	1.0	16.3	30.5	2.0	51.8
<i>Oc. infirmatus</i>	1.0		26.0	11.0		38.0
<i>An. quadrimaculatus</i>	12.0	9.0	2.3	2.5	5.5	31.3
<i>Ps. howardii</i>			9.0	19.0		28.0

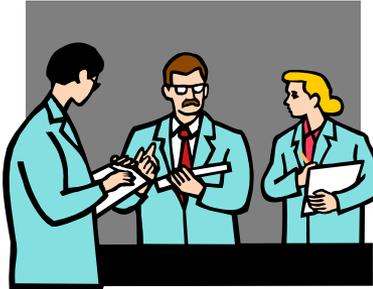
species	2010	2011	2012	2013	2014	Grand Total
<i>Ps. ciliata</i>		6.0	6.0	11.0	1.0	24.0
<i>Cx. coronator</i>			7.0	8.0	2.0	17.0
<i>An. punctipennis</i>	7.0	1.0	0.3	3.5		11.8
<i>Oc. triseriatus</i>		1.0	1.0	2.5	1.5	6.0
<i>Oc. fulvus pallens</i>			0.3	4.0	0.5	4.8
<i>Oc. canadensis</i>			2.0	1.5		3.5
<i>Oc. trivittatus</i>				3.0		3.0
<i>Ps. cyanescens</i>			0.3	1.5		1.8
<i>Oc. mitchellae</i>			1.3			1.3
<i>Oc. taeniorhynchus</i>	1.0					1.0
<i>Or. signifera</i>				1.0		1.0
<i>Tx. rutilus</i>				0.5	0.5	1.0
<i>Ur. sapphirina</i>				1.0		1.0

Species per trap night by year

What Next?

- I had a meeting with Public Works
- State VBD epidemiologist was notified
- VBD epidemiologist contacted the District HD
 - Case was contacted
 - HD drew blood
 - Blood was sent for testing to CDC through GPHL





THEN WE (the Health Dept) WAITED



What about Mosquito Control?



Statesboro Mosquito Control

- Small complaint-driven program
- Primarily adulticiding
- Part of the Public Works program
- Spray within city limits only
- GDPH assists with monthly surveillance



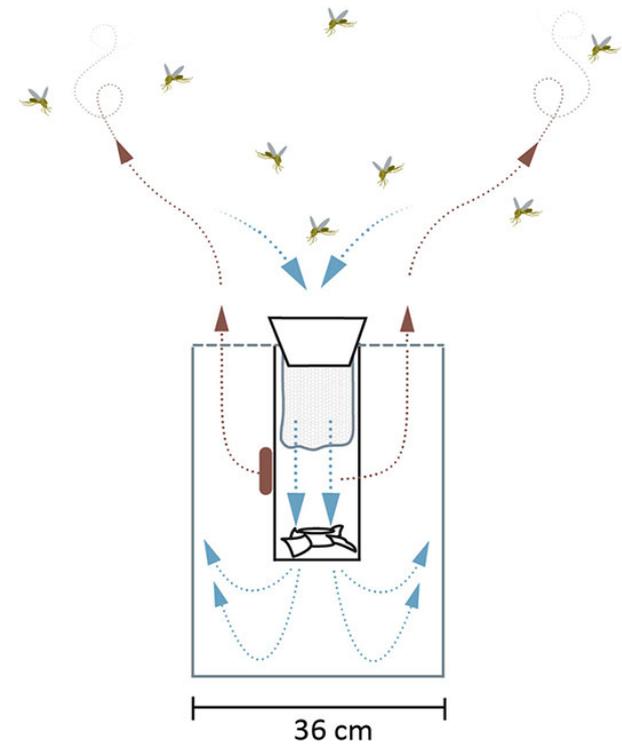
Possible CHIK case? What next?



- Statesboro mosquito control
 - Did a walk through of the case site on July 16
 - Contacted Trey English from ADAPCO to borrow another sprayer
 - Contacted Chatham County Mosquito Control
 - Bobby Moulis and Laura Peaty did surveillance at CHIK sites
 - Helped to re-evaluate the control efforts as they were being done
 - Did adulticide application in area around possible case site
 - The case site was sprayed just about every day
 - The city was sprayed once
 - Repeated adulticiding in early morning to specifically target *Aedes albopictus*
 - Continued control until trap data showed a decrease in *Ae albopictus* numbers



Site	<i>Aedes albopictus</i>	<i>Ae albopictus</i> (male)	<i>Ae aegypti</i>
123 Backshell Road BGS	46	31	0
204 Pinewood Drive	4	0	0
Nevil Tire	163	11	0
Grand Total	213	42	0



7/23/14

Things That Were Considered

- Would a thermal fogger work better?
- What about aerial spraying?
 - Henry Lewandowski and Jeff Heusel from Chatham County Mosquito Control assisted with planning
 - Due to FAA rules, the city would have had to contract with a private company
- Considered testing mosquitoes if case was CHIK+

Politics

- The city manager had lunch with the local hospital administrator to discuss the problem
- The hospital administrator shared info with the health community
- Mosquito control program controlled the info released to the media
- Additional information on CHIK was obtained from both FL and SC

Lessons Learned

What Went Wrong

- There is a lag in notification about potential CHIK cases both to and from the state health department (this is an on-going problem)
- Currently there is a HUGE lag time in testing for CHIK
- Local mosquito control was never notified
- Mosquito Control and the LHD do not have a working relationship

What Went Right

- Mosquito Control reached out to and built working relationships with other local mosquito control programs
- GDPH and local mosquito control have a good working relationship
- The response to a possible locally-acquired CHIK case was appropriate and timely based on notification of mosquito control

What Needs to be Fixed?

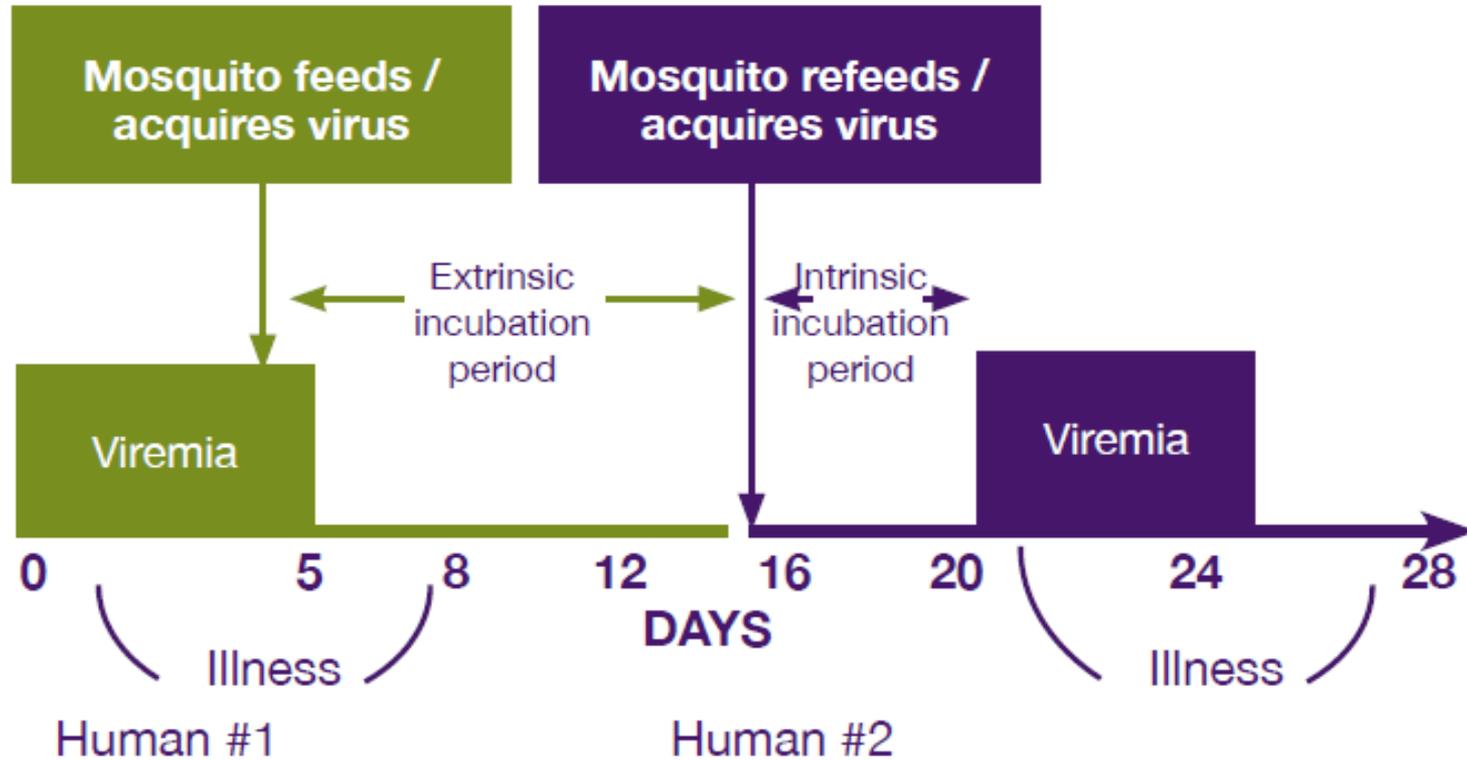
- There is a lack of understanding that CHIK cases produce sufficient viremia to infect mosquitoes during the first week or so of illness.
- Delays in testing and reporting increase the probability of local mosquitoes becoming infected.
- The health department and mosquito control are both components of public health and need to work together to deal with vector-borne diseases.
 - Fortunately there are a few health departments that do work closely with mosquito control.
 - However, too many health departments are not even aware of mosquito control programs in their counties.

What about the Possible Case?

- Sent: Friday, August 08, 2014 7:53 AM
To: Kelly, Rosmarie
Subject: RE: Statesboro

I heard from Jennifer at CDC and L.G. (Statesboro res with no travel) was negative for CHIK. She's actually not in the mail out that went to GPHL because these results are still in the approval queue at CDC and shouldn't be shared until they are approved, but I wanted to let you know.

Figure 1. Extrinsic and intrinsic incubation periods for Chikungunya virus.



The News from Florida

Florida is the only state in the U.S. to have locally acquired cases of the mosquito-borne disease chikungunya, and the numbers, though small, have increased more than 100 percent since July, according to the latest federal data.

Since mid-summer, there have been anywhere from 500,000 to 1 million chikungunya cases in the Caribbean Basin, said Walter Tabachnick, director of the Florida Medical Entomology Laboratory at the University of Florida.

While modern amenities like air conditioners, screened-in porches, larvaecide and insecticide will likely prevent numbers from reaching anywhere near those levels in the United States, Tabachnick and other scientists worry Florida and other states could be in the beginning stages of an epidemic.

"Are we prepared for that? Personally, I do not think so," Tabachnick said. "We have only tracked 11 [locally acquired] cases. Think about 10,000."

Coming epidemic?

Durland Fish, a professor of entomology at Yale University's School of Public Health, worries that Florida's mosquito control authorities are not doing enough to coordinate efforts with public health officials to stop the disease from spreading once cases are confirmed.

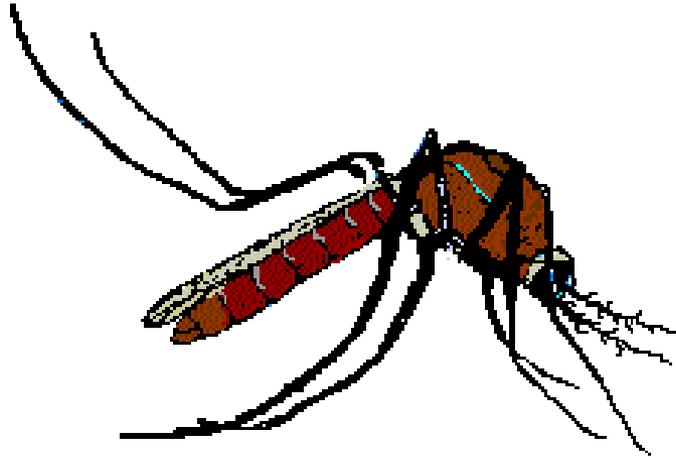
"Every day they wait is a day too late," Fish said. "You may have an epidemic already. Anything above zero is an epidemic for a new disease."

Fish said once a case has been identified, mosquito control authorities should thoroughly spray insecticide around the area where the person was likely bitten, and inside that person's home.

Acknowledgements

- Statesboro Public Works
 - Robert Seamans
 - Joey Bland
- Chatham County Mosquito Control
 - Henry Lewandowski
 - Jeff Heusel
 - Bobby Moulis
 - Laura Peaty
- ADAPCO
 - Trey English
- GDPH
 - Melissa Ivey
 - Amanda Feldpausch
- The unknown case and her family





ANY QUESTIONS?