Georgia Department of Public Health

Georgia's response to arboviruses: The vector surveillance program and increased statewide mosquito surveillance

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We Protect Lives.

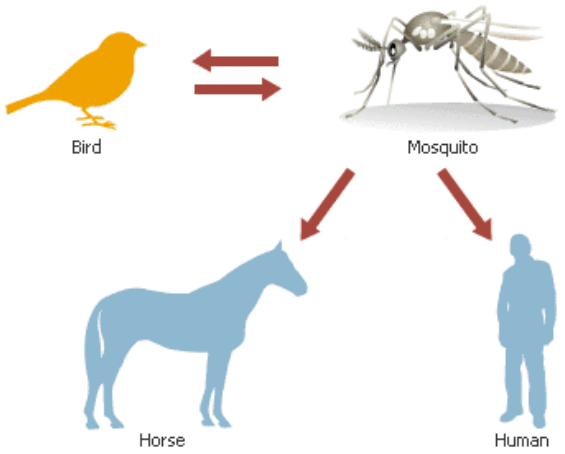
What does Environmental Health have to do with mosquito control?

- Historically, EH had been tasked with dealing with mosquito complaints
  - Many of these programs have been lost as other, mandated, programs took precedence
  - Only 2 county EH programs (Richmond & Muscogee) still did mosquito control prior to the arrival of WNV
- Mosquitoes were largely a nuisance in most of Georgia until WNV came along (2001)
  - Programs developed within EH to deal with vector species
  - An entomologist was hired at the State DPH to assist with mosquito surveillance activities
- WNV funding diminished and “new” mosquito control programs in EH were lost or downsized

Disease Issues

Most Common Arboviral Diseases in Georgia

- **West Nile Virus***
- Lacrosse Encephalitis*
- Eastern Equine Encephalitis*



Primary Vectors

- WNV – *Culex quinquefasciatus* (Southern House Mosquito)
- LAC – *Aedes triseriatus* (treehole mosquito)
- EEE – *Culiseta melanura* (birds); many others (mammals)

*zoonotic diseases

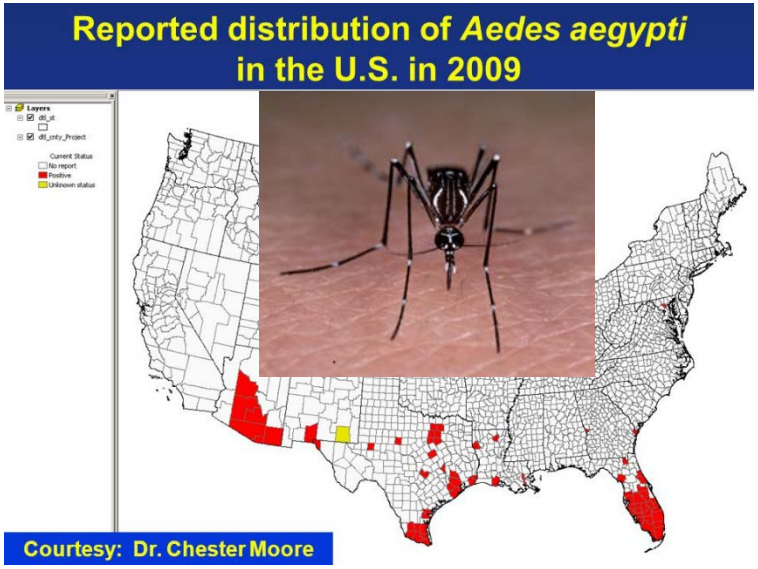
Then, along came ZIKV

- The State EH was tasked with providing mosquito surveillance, and potentially control, in Georgia's 159 counties.
  - at that time, only a few counties still had WNV programs or worked with local mosquito control to monitor mosquito populations
  - the State Public Health Entomologist provided mosquito surveillance for other WNV higher risk areas in Georgia
- Our response
  - the Vector Surveillance Coordinator program
  - training for EH Strike Teams
  - cross-training local EH to assist with surveillance as needed

Aedes (Stegomyia) spp: Container Breeders

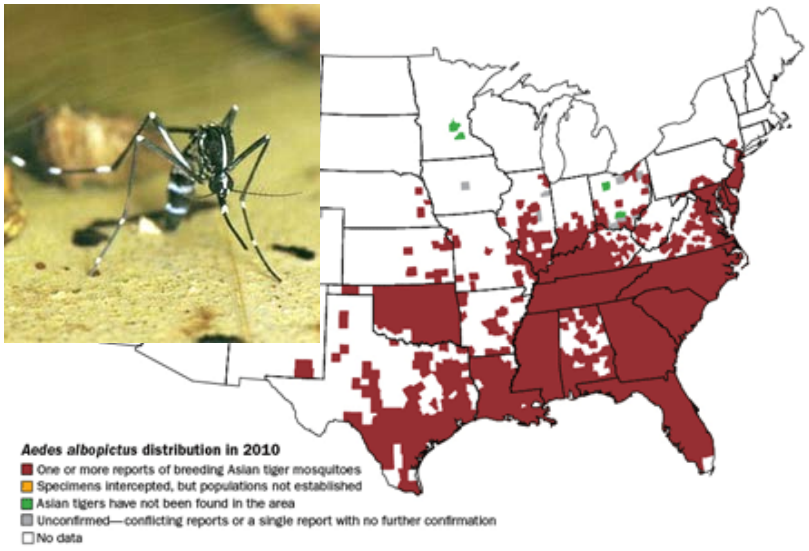
Ae. aegypti

- Associates closely with people
- Primary vector of a number of viruses
- Urban mosquito
- Daytime biting mosquito
- Shy biter - takes multiple small blood meals
- Found in a few locations in Columbus, GA



Ae. albopictus

- Aggressive, daytime biting mosquito
- Associated with used automobile tires
- Suburban species
- Broad host selection
- Found everywhere in Georgia



Where is the Highest Risk?

Aedes albopictus is found everywhere in Georgia

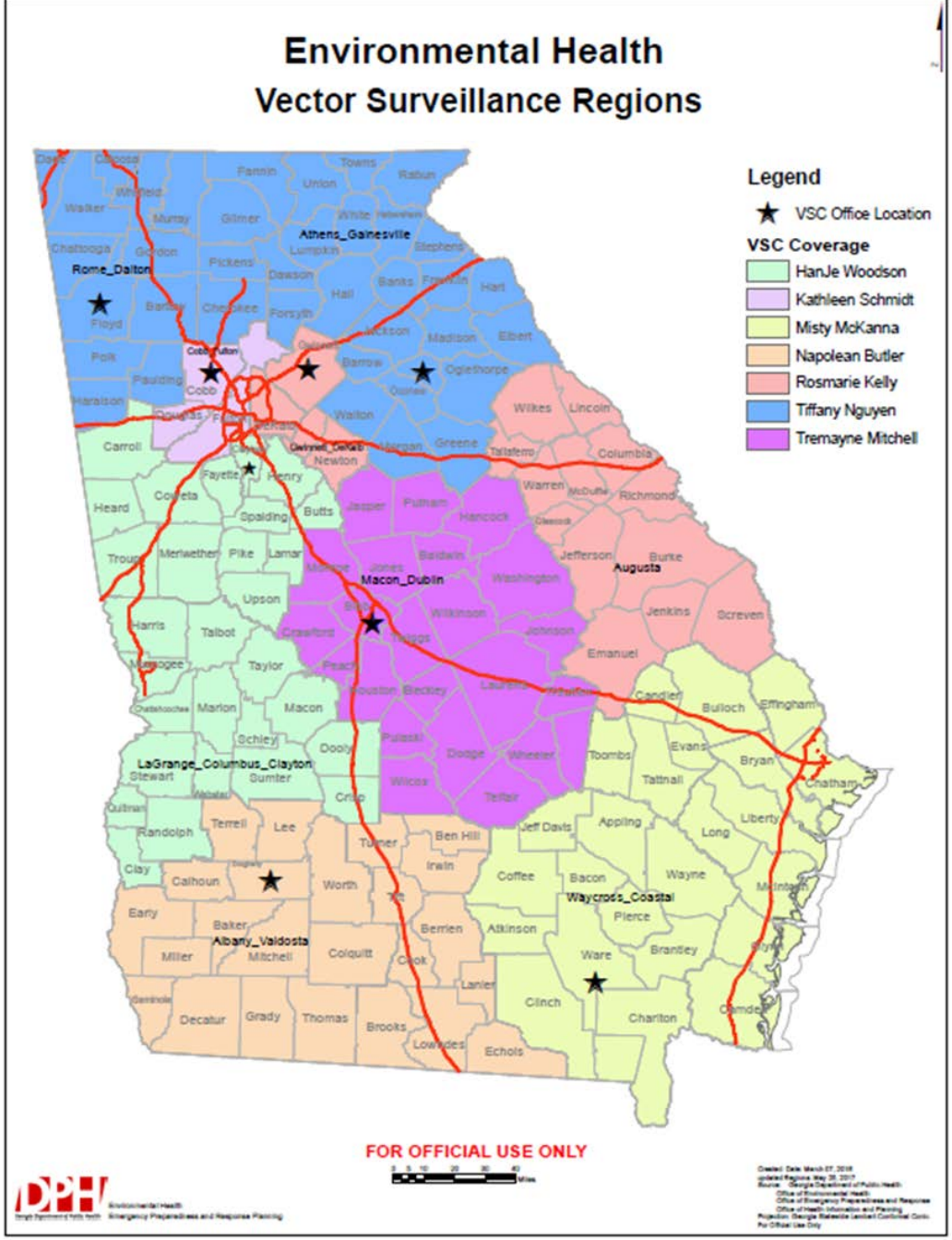
This is Georgia's number one pest species after the saltmarsh mosquitoes

Because it feeds on a variety of hosts, the greatest risk of disease transmission occurs in urbanized areas where humans are the most abundant host

Aedes aegypti has recently only been found in Columbus and Savannah (not since 2012)

While this used to be a common species in Georgia, it is currently rare

It feeds exclusively on humans and may feed on multiple people to get a blood meal, making it a very competent vector for ZIKV



Vector Surveillance Coordinator (VSC)

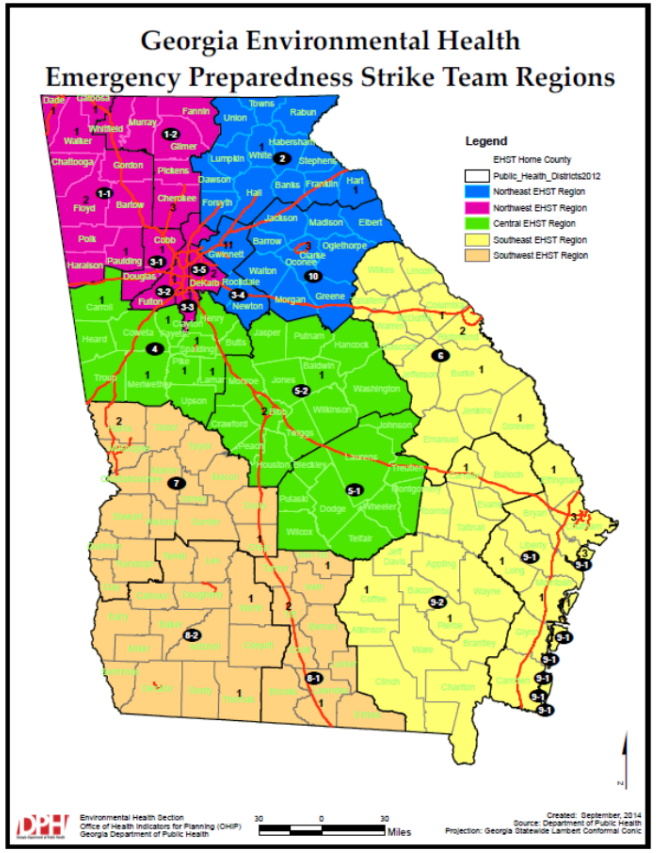
This position has primary responsibility to conduct and coordinate mosquito surveillance for arboviral diseases such as West Nile Virus, Eastern Equine Encephalitis, Lacrosse Encephalitis, Zika and other arboviral diseases in a multi-county region. Duties include:

- establishing surveillance locations throughout the PH Districts,
- setting up traps and collecting mosquitoes,
- mosquito identification,
- community assessments, and
- education programs.

When necessary, this position will coordinate mosquito control activities with existing city/county/contracted mosquito control agencies and assist with localized control efforts.

Environmental Health Strike Teams

- Regional Team Coordination
  - 5 Regions
    - Two (6) six person teams per region
    - 80 members on the roster
- Environmentalists
  - Trained
  - Credentialed
  - Prepared to Deploy
    - Member Go Bags
    - Team Go Bags
    - Incubators
    - Supplies
- Supply trailers support Strike Team activities
- EH Strike Teams function within the ICS under ESF 8- Public Health



Vector Surveillance Training

Complaint Investigation

- Education
  - Tip and Toss
  - Personal protection
- Surveillance & ID
  - Surveillance
    - Light traps with CO^2
    - Gravid traps
    - BGS traps
    - Larval dipping
  - Species Identification
- Control
  - Larviciding
  - Barrier spray

Vector Control Training

- Primarily for locally-acquired cases
- Limited site treatment
  - Larvicide Dunks
  - Mosquito Back Pack Sprayer
    - Maverick barrier spray
    - Larvicide pellets

Mosquito Control Support

- 11 total trailers (10 new)
- Mosquito Trailer (Statesboro)
  - moveable lab
  - contains surveillance & ID equipment
- Additional trailers
  - Surveillance Equipment
  - Control Equipment & Supplies

Other Considerations

Besides training and personnel, what has been missing from EH programs tasked with doing mosquito surveillance and control?

- Equipment
- Pesticide

- VSC Regions & non-VSC Districts were supplied with:
  - mosquito traps
  - dissecting microscopes
  - backpack mister/blowers
    - larvicide
    - barrier spray

Number of Counties with Mosquito Surveillance Per Year

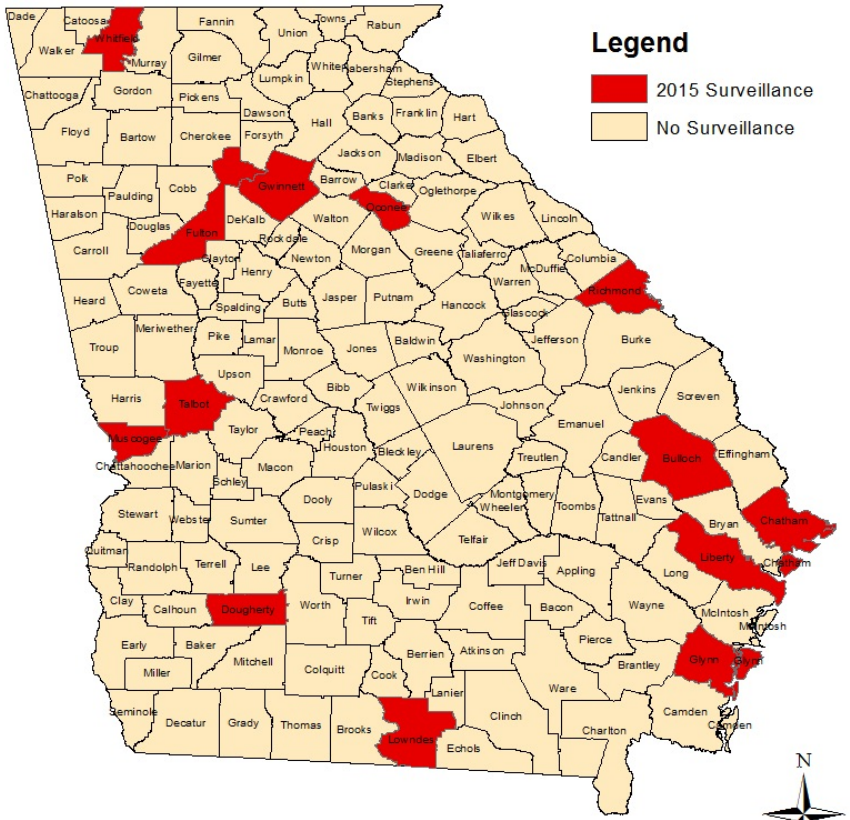
What We Did in 2016

mosquitoes			
	# mosquitoes	# counties	count/county
Aedes albopictus			
other sites	3038	32	95
ZIKV sites	224	8	28
Aedes aegypti			
other sites	26	1	26
ZIKV sites	0		

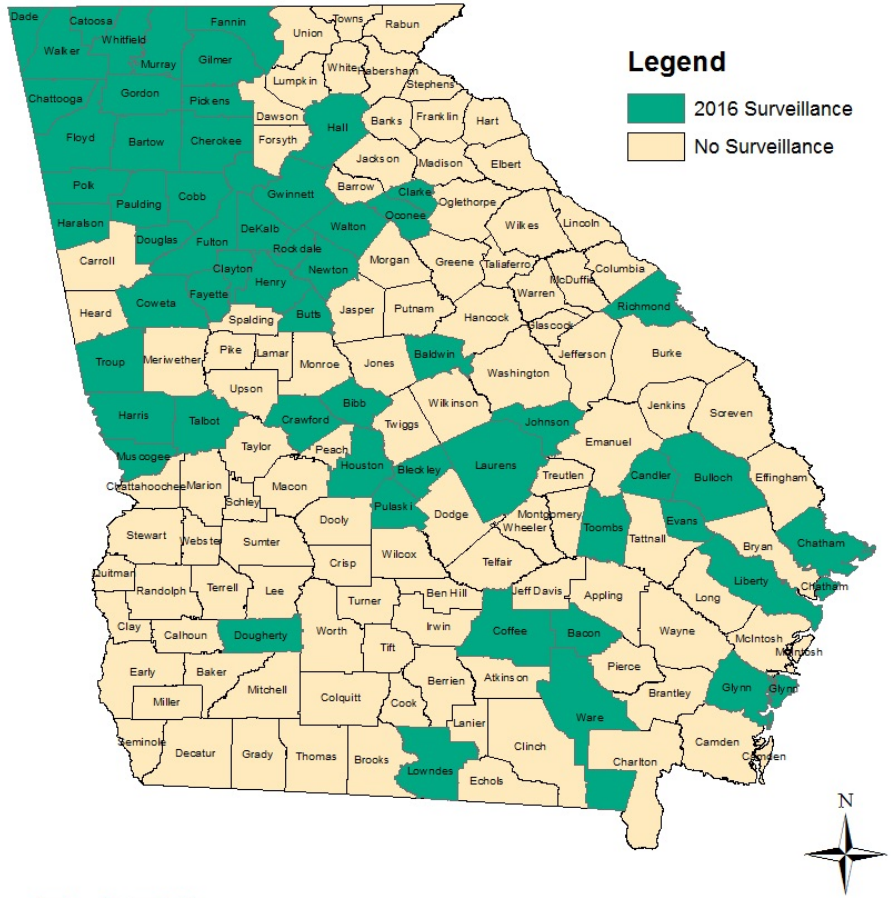
year	# counties
2006	12
2007	10
2008	12
2009	10
2010	16
2011	14
2012	6
2013	8
2014	10
2015	13
2016	60

Georgia Mosquito Surveillance by County

2015



2016



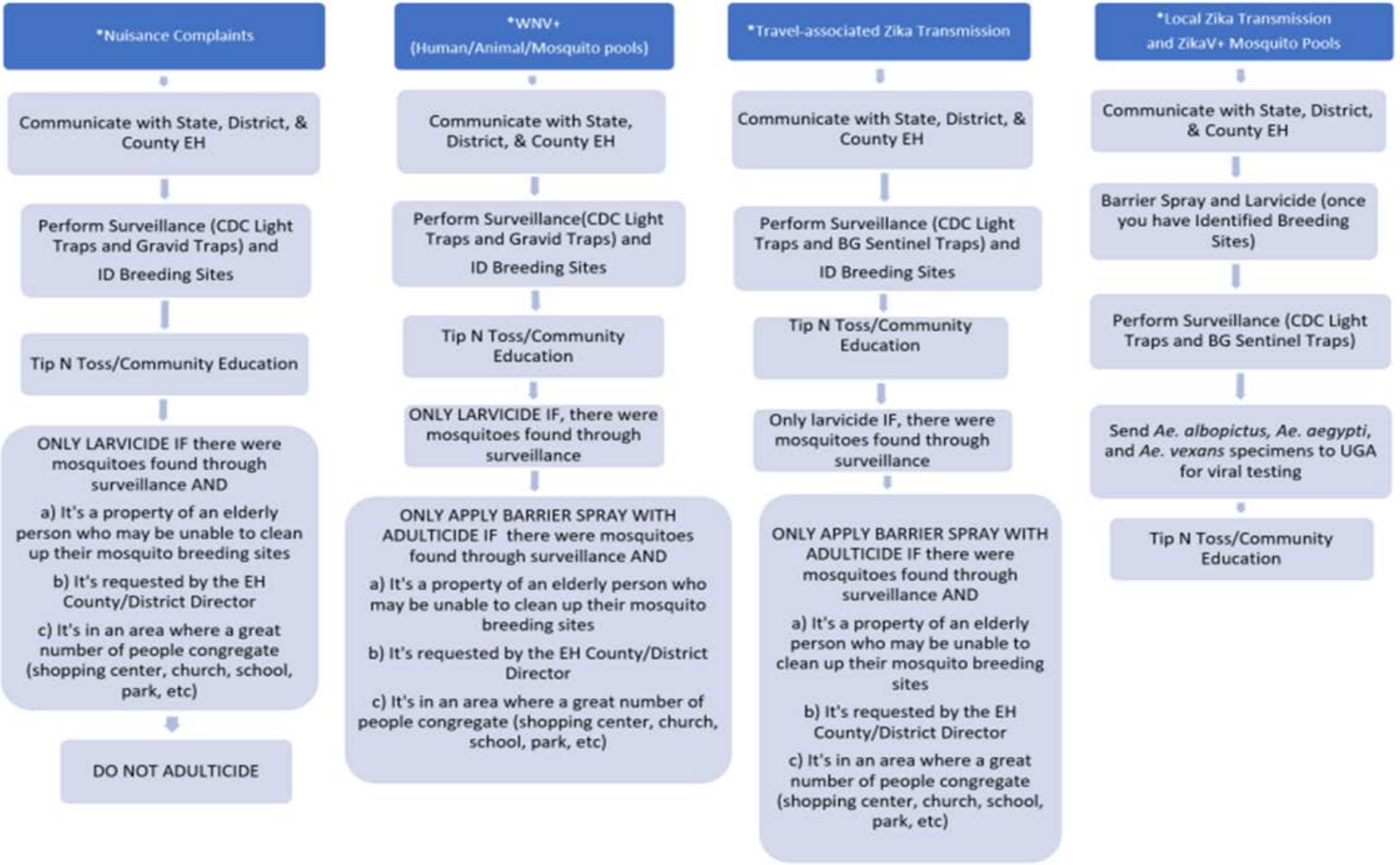
2017

- In 2016 we had 4 VSCs, we now have 5
  - they are placed in areas of potential higher risk
  - they are in areas with little to no mosquito control in most of the counties in their region
- We have an assistant entomologist
- There has been additional & more comprehensive training (Larval & Adult ID class)

GOALS FOR 2017

- Do some level of mosquito surveillance in every county in Georgia
- Provide mosquito surveillance equipment and train interested people in every Health District to do mosquito surveillance, ID, and control

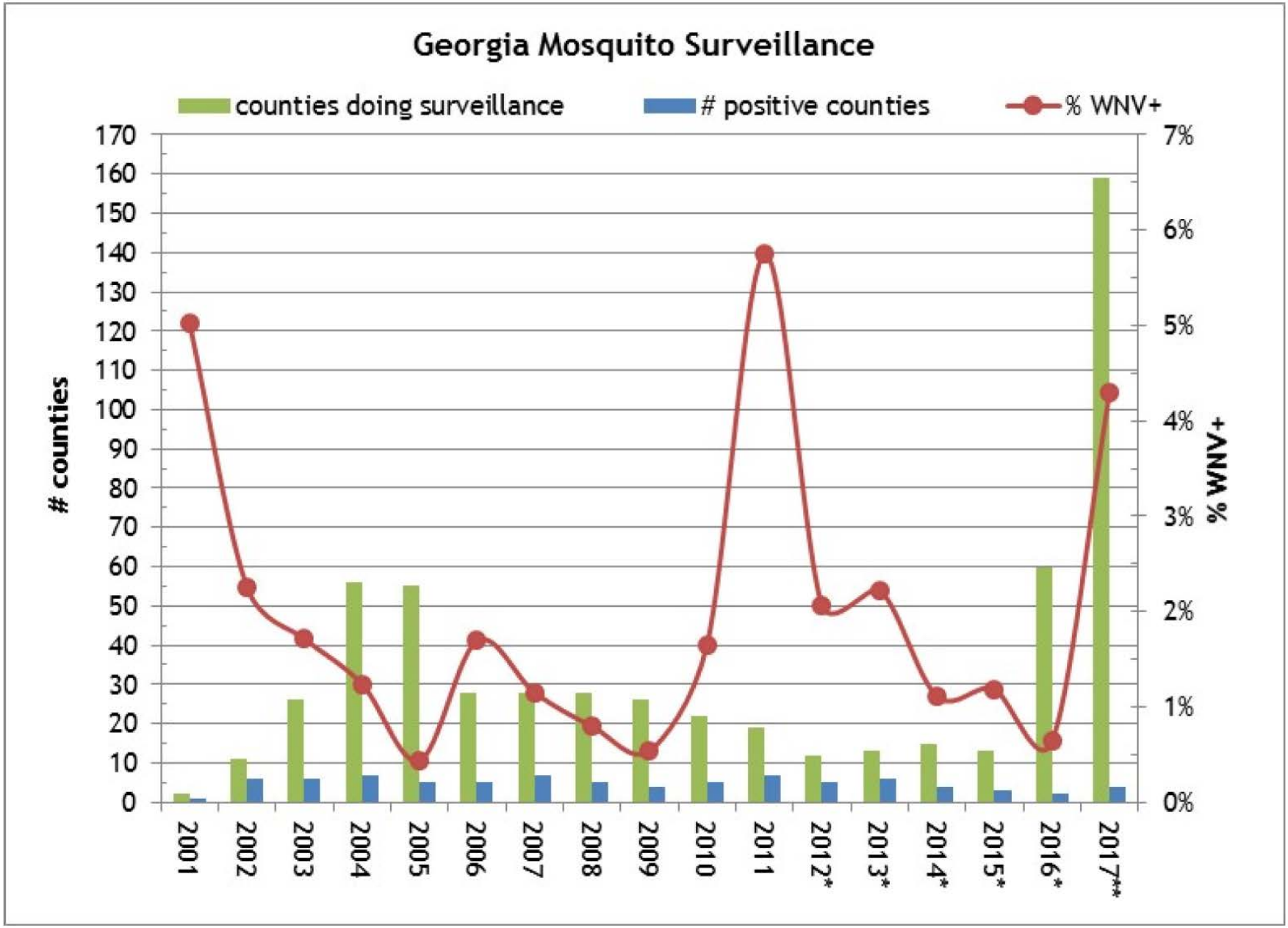
Vector Surveillance Coordinator Response Process Flow Chart



*For all situations, be sure to always work with mosquito control if a local program is present.

If the local program is a spray-only program, surveillance and larviciding should still be performed.

For locally-acquired zika, treatment is still performed, even if local mosquito control is also involved. If there is no local mosquito control agency, and there is more than one case, contact state EH to set up treatment by the mosquito control company contracted by the state. For one case, see above.



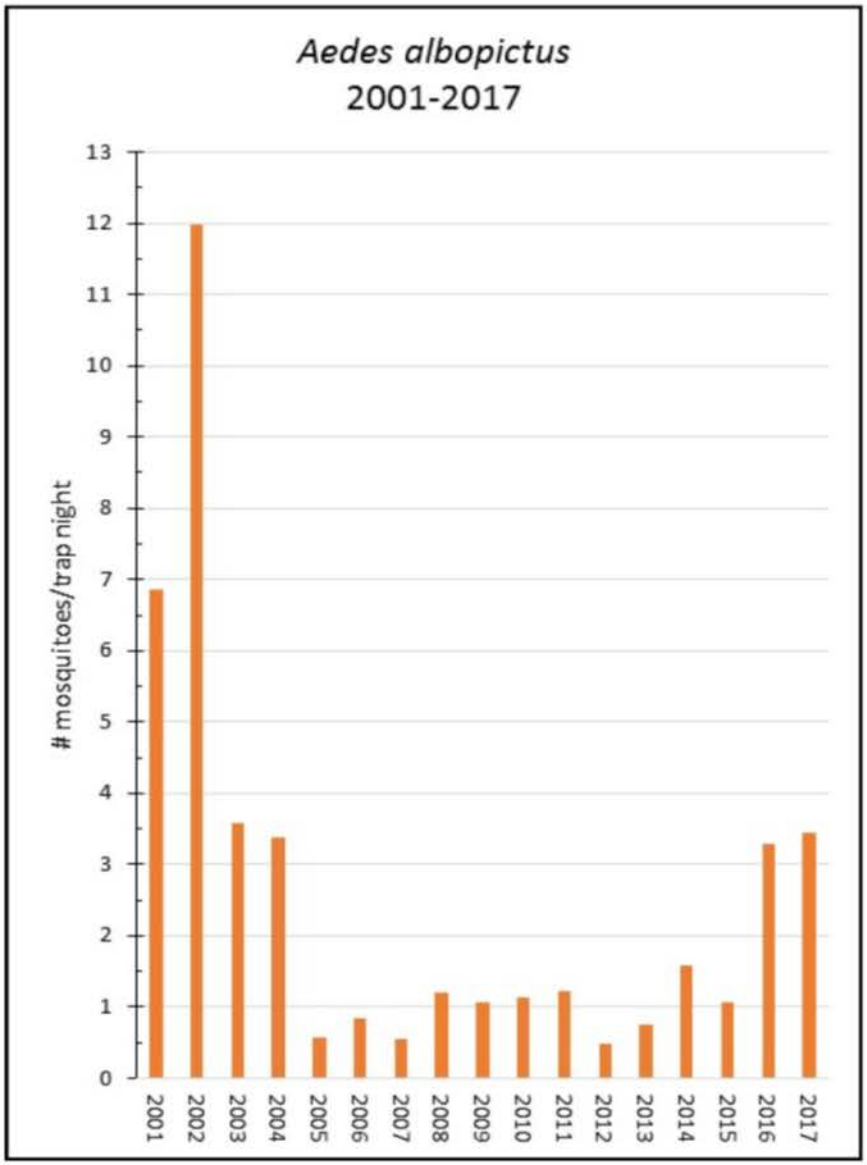
*6 counties doing testing

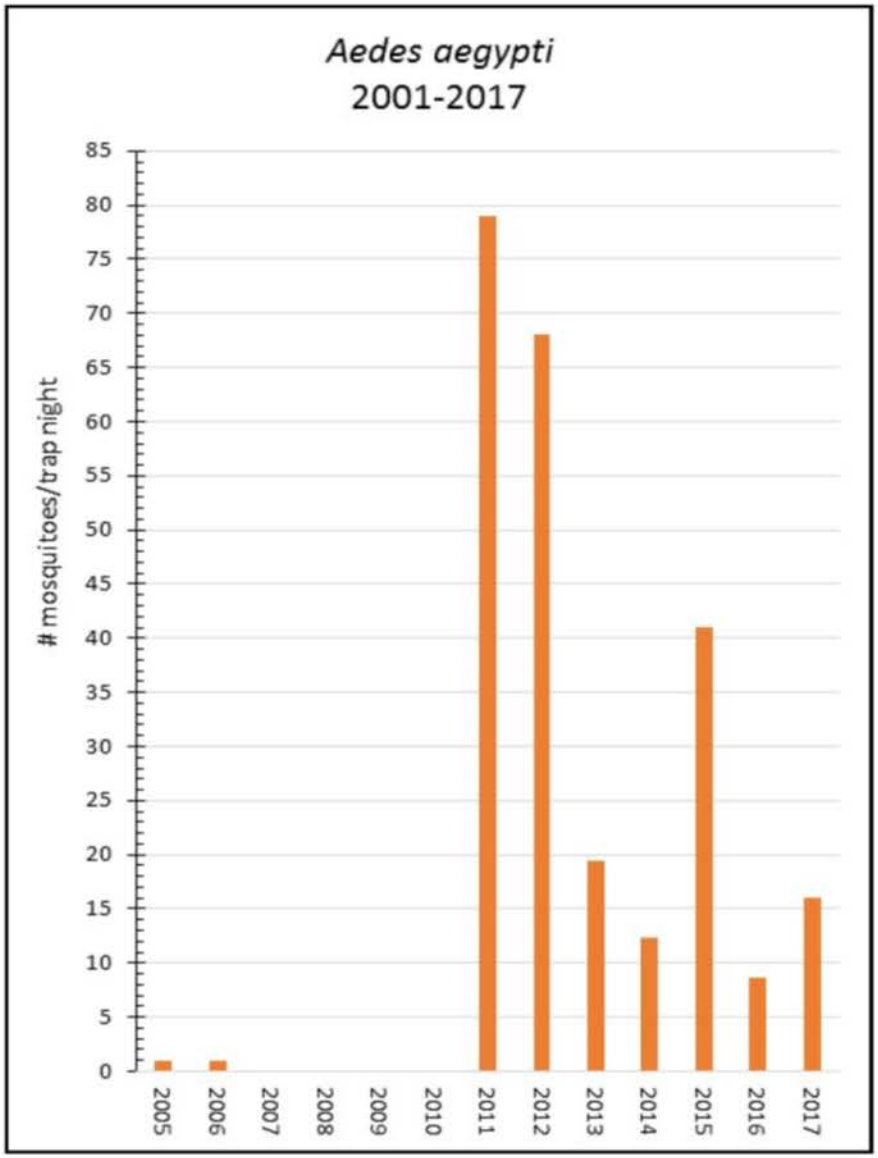
**5 counties doing testing

Human cases (exotic) Arboviruses in Georgia

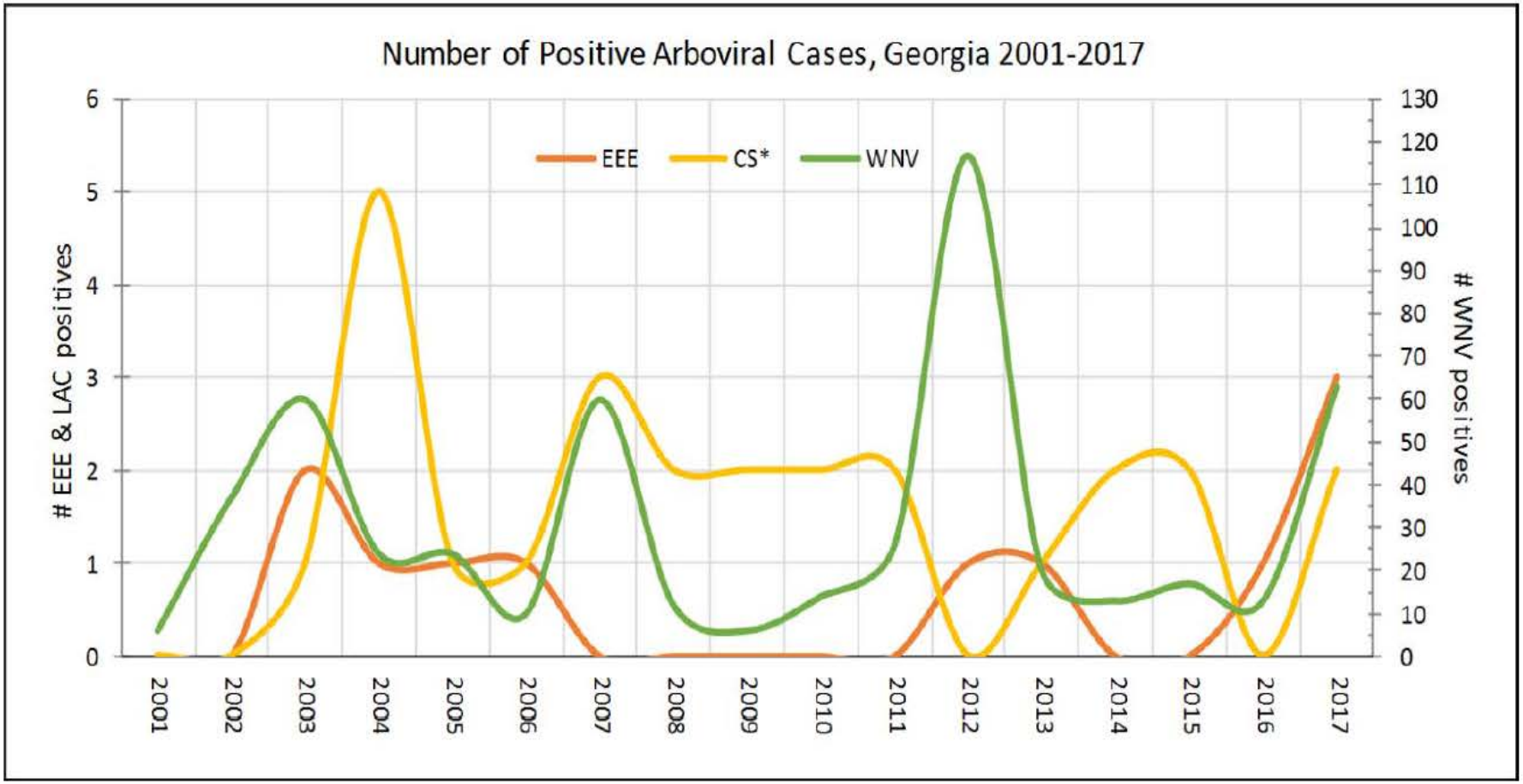
Year	Virus	No. of Cases
2014	CHIK	20
	DEN	4
2015	CHIK	8
	DEN	4
	ZIKV	1
2016	CHIK	1
	DEN	21
	ZIKV	113
2017	CHIK	2
	DEN	5
	ZIKV	11

ZIKV Surveillance





Human Arboviral Cases in GA



Human Cases (endemic)- WNV

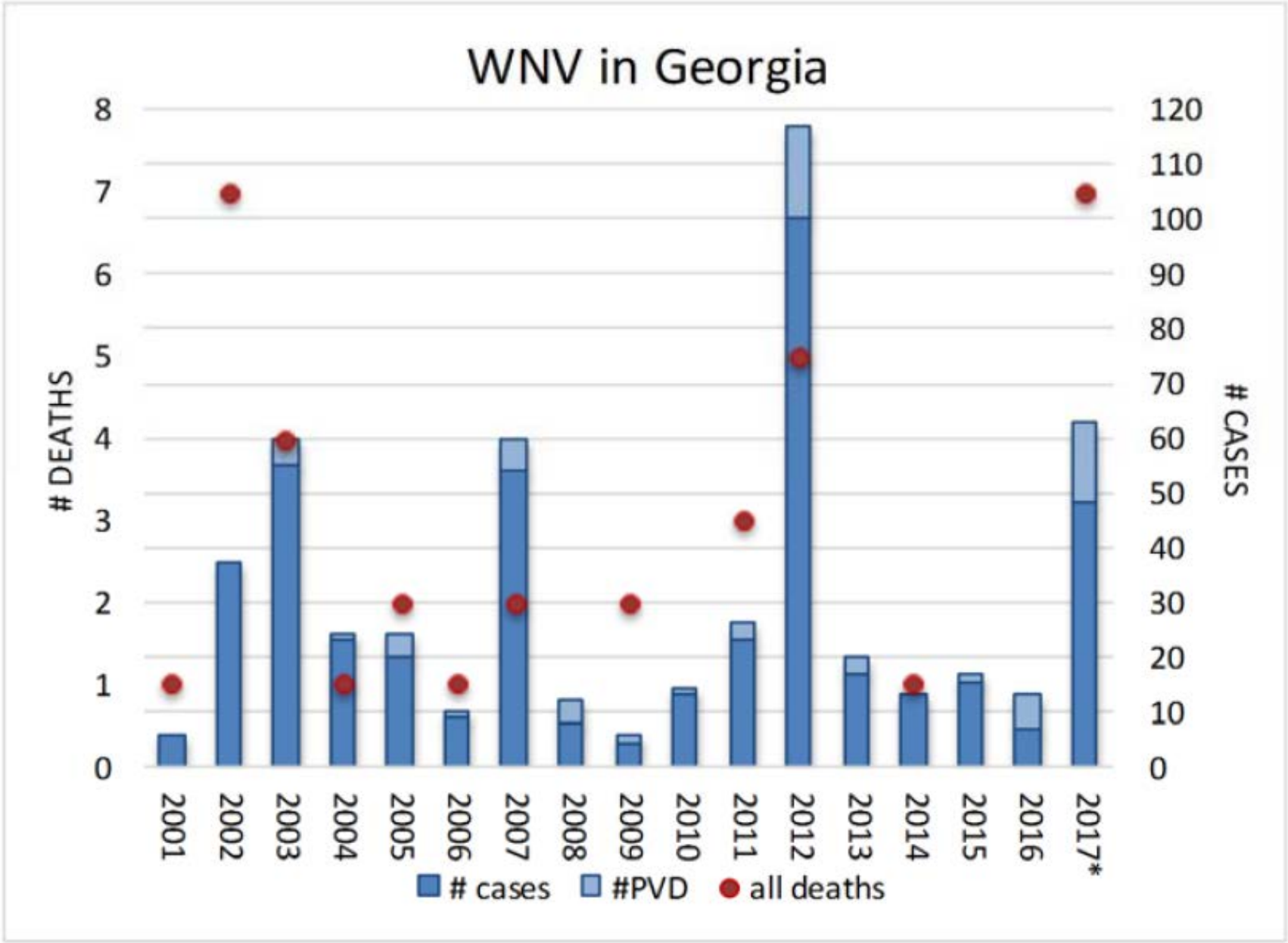
In 2017, Georgia reported 48 cases of WNV and 16 WNV presumptive viremic blood donors (*PVD), with 7 deaths.

- Forty-three (89.5%) of the 48 cases experienced WNV neurologic illness (altered mental status, paralysis, encephalitis, GBS and/or meningitis) and 5 (10.2%) were diagnosed with WNV fever.
- The average age of cases was 61.4 years (range 17-87).
    - The average age of those with WNV neurologic illness was 64.6 years (range 26-87).
- Forty (83%) of the 48 cases were male.
- The majority of cases were reported in July, August, and September, with the peak in August.

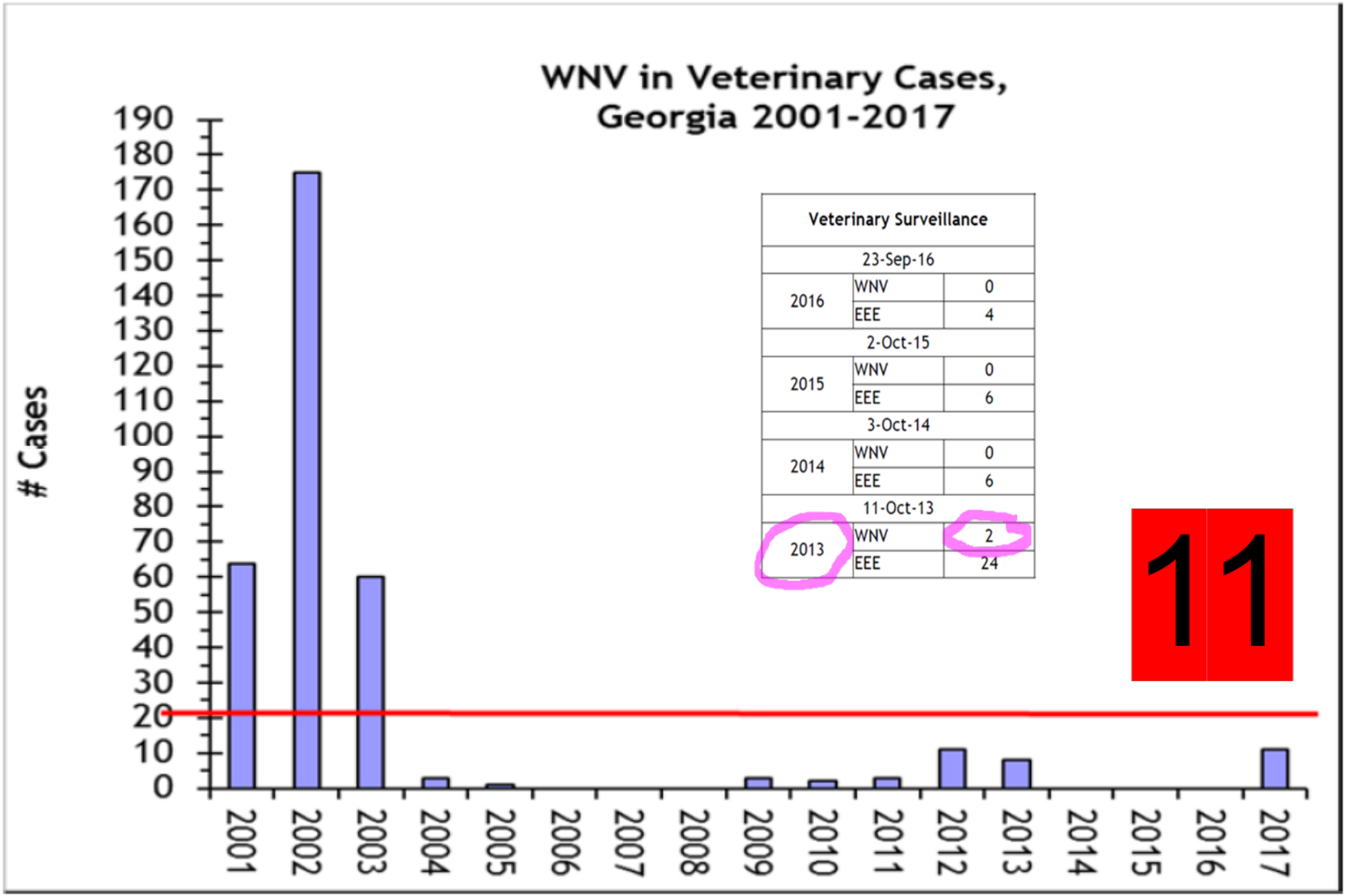
Cases by Year (includes asymptomatic cases*)			
Year	EEE	CS	WNV
2001			6
2002			37
2003	2	1	60
2004	1	5	24
2005	1	1	24
2006	1	1	10
2007		3	60
2008		2	12
2009		2	6
2010		2	14
2011		2	26
2012	1		117
2013	1	1	20
2014		2	13
2015		2	17
2016	1		13
2017	3	2	64
Grand Total	**11**	**26**	**523**

*Presumptive viremic blood donors (PVDs) are people who had no symptoms at the time of donating blood through a blood collection agency, but whose blood tested positive when screened for the presence of West Nile virus.

Human WNV in GA (2001- 2017)

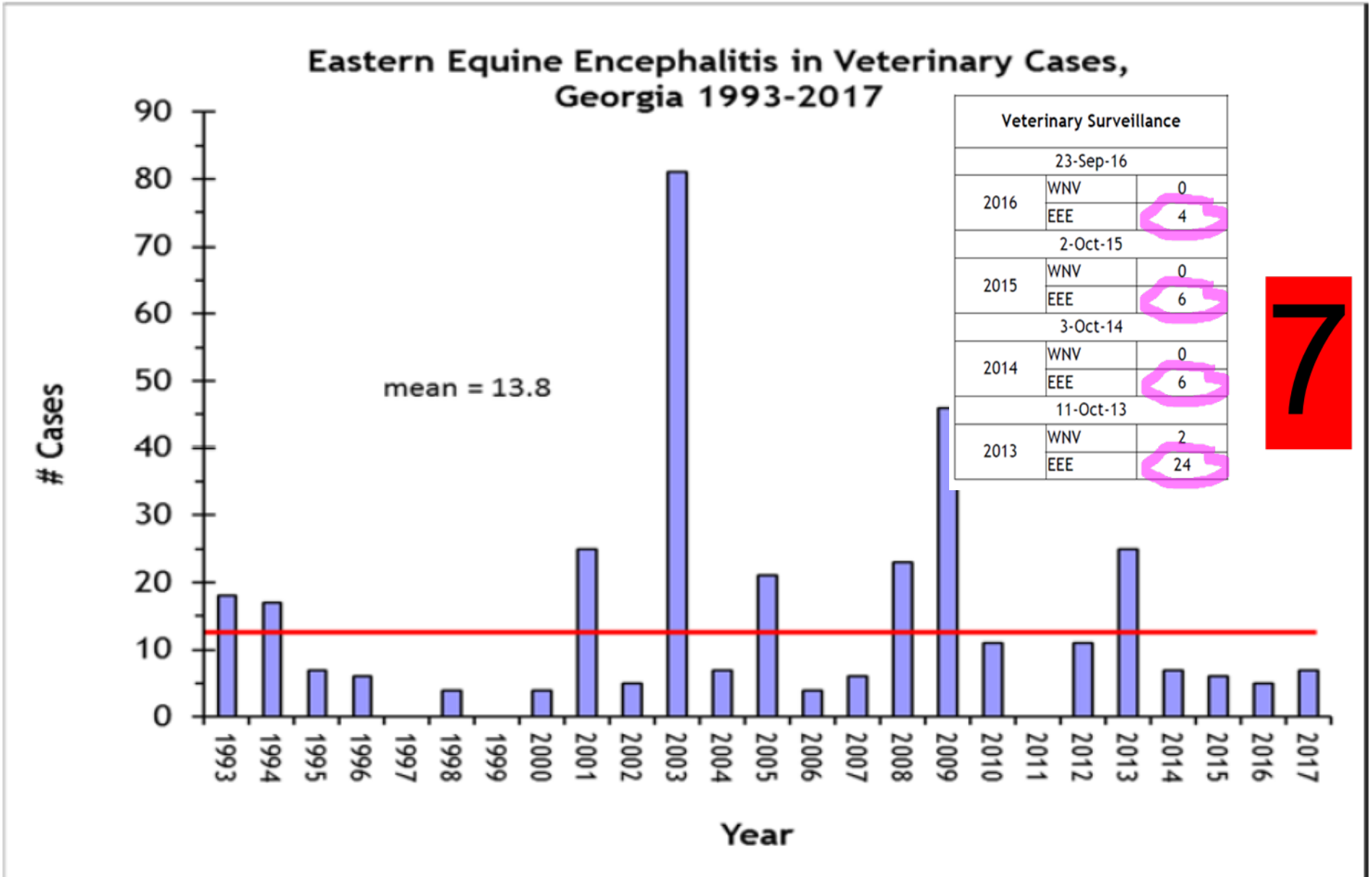


WNV in Companion Animals/Livestock (GA 2001-2017)



Veterinary Surveillance		
23-Sep-16		
2016	WNV	0
	EEE	4
2-Oct-15		
2015	WNV	0
	EEE	6
3-Oct-14		
2014	WNV	0
	EEE	6
11-Oct-13		
2013	WNV	2
	EEE	24

EEE in Companion Animals/Livestock (GA 2001-2017)



WNV Surveillance Summary

year	WNV+ mosquito pools	counties doing mosquito surveillance	# WNV+ counties (mosquitoes)	total mosquitoes pools tested	% WNV+ mosquito pools	WNV+ humans
2001	30	2	1	597	5.03%	6
2002	91	11	6	4032	2.26%	36
2003	106	26	6	6177	1.72%	55
2004	126	56	7	10161	1.24%	23
2005	67	55	5	15248	0.44%	24
2006	81	28	5	4785	1.69%	11
2007	75	28	7	6513	1.15%	55
2008	51	28	5	6383	0.80%	12
2009	24	26	4	4446	0.54%	6
2010	99	22	5	5990	1.65%	14
2011	438	19	7	7622	5.75%	25
2012*	125	13	5	6042	2.07%	117
2013*	166	13	6	7453	2.23%	20
2014*	56	15	4	5038	1.11%	13
2015*	40	13	3	3366	1.19%	15
2016*	36	60	2	5620	0.64%	13
2017**	276	159	4	6418	4.3%	64

*6 counties doing testing

**5 counties doing testing to date

2017 WNV+ and EEE+ pools by species

Species	WNV+ pools	EEE+ pools
Cs. melanura		2
Cx. nigripalpus	2	
Cx. quinquefasciatus	262	
Cx. restuans	1	
Culex spp.	11	

2017 GA WNV+ Pools by County

County #	# of submitted Mosquitoes	WNV+ pools	MIR
Chatham	46126	93	2.02
DeKalb	13719	155	11.30
Fulton	5042	27	5.36
Glynn	23912		
Lowndes	30936	1	0.03

Improvements to the Program for next year

- Perform surveillance earlier
- Identify more and higher yielding surveillance sites
- Provide more Identification classes
- More counties/districts are now equipped with more surveillance and control equipment
- Surveillance performed in each counties more than once by VSCs

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ANY QUESTIONS?

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