2023—Arbovirus Final Report

Summary of Human West Nile Virus and Other Arboviral Infections, Georgia 2023

West Nile virus (WNV) is a mosquito-borne disease of birds. Humans are occasionally infected with WNV through mosquito bites. Approximately 1 in 5 people infected with WNV develop symptoms of "West Nile Fever", which is often characterized by fever, headache, fatigue, and muscle pain or weakness. Less than 1% of people infected with WNV develop neurologic disease such as meningitis, encephalitis, or flaccid paralysis.

West Nile virus was first recognized in Georgia in July 2001. That year, there were 6 human cases of WNV encephalitis reported in Georgia, including one death. Since then cases have been reported each year with varying numbers of human deaths.

To improve identification of Georgians infected with WNV, surveillance for WNV illness in humans was expanded for the 2003 transmission season to include all acute infections of WNV. In addition, routine screening of the nation's blood supply began in 2003, resulting in the identification of persons infected with WNV prior to the development of symptoms, if symptoms developed at all.

While the majority of human infections with arboviruses have resulted from bites by infected mosquitoes, other rare modes of transmission have been identified, including blood transfusion and organ transplantation.

Historical data on arboviral diseases in Georgia 2002-2022 are available upon request.

In 2023, Georgia reported 19 cases of WNV and 9 WNV presumptive viremic donors (PVD), with 2 deaths. Presumptive viremic donors (PVDs) are people who had no symptoms at the time of blood donation or other testing, but tested positive for the presence of select arboviruses. Although we track and report PVDs to the CDC for epidemiological purposes, we do not count these as cases in our state.

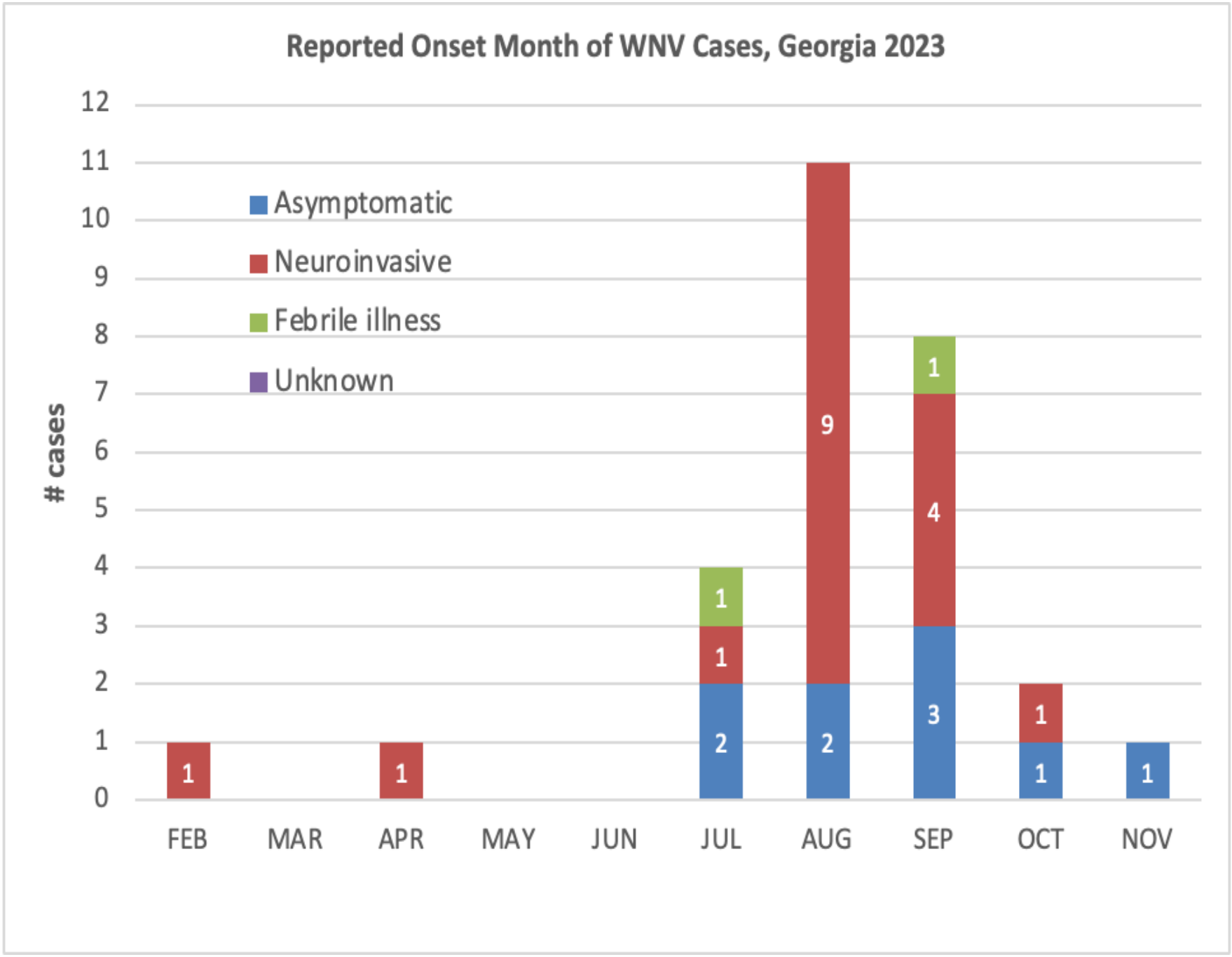
To date, 19 WNV disease cases were reported from 9 counties in 9 public health districts. Among these cases, seventeen (89.5%) of the 19 cases experienced WNV neurologic illness (altered mental status, paralysis, encephalitis, GBS and/or meningitis) and 2 (10.5%) were diagnosed with WNV fever. The average age of cases was 57.3 years (range 14-80). The average age of those with WNV neurologic illness was 58.2 years (range 14-80). Sixteen (84.2%) of the 19 cases were male. Most cases were reported in August and September, with the peak in August.

California serogroup (CS) viruses, including California encephalitis, Keystone, La Crosse, Jamestown Canyon (JCV), snowshoe hare, and trivittatus, belong to the Bunyaviridae family of viruses. In the United States, La Crosse virus (LACV) is the most common of the California serogroup viruses. There was one case of California Serogroup, non-specified reported in Georgia in 2023.

Saint Louis encephalitis virus is related to WNV and is a member of the Flaviviridae subgroup. Until recently, SLE had not been reported in Georgia since the 1970s. In 2018, one case of SLE was reported in Georgia. There were no SLE cases reported in Georgia in 2022.

One case of Eastern Equine Encephalitis (EEE) was reported in 2023.

The first travel-associated case of Zika was reported in Georgia in December 2015. In 2016, there were 113 travel-associated cases reported in Georgia. In 2017, there were a total of 11 travel-associated cases, 8 of which were asymptomatic. In 2018, a total of 2 asymptomatic travel-associated ZIKV cases were reported. In 2019, there were 5 travel-related ZIKV cases reported, 4 of which were asymptomatic. There was also 1 case of occupationally-acquired ZIKV. Between 2020 and 2023, no travel-related cases of ZIKV were reported. To date there have been no locally transmitted (mosquito to human) cases of Zika in Georgia. Twenty-four travel-associated Dengue cases were reported in 2023, but no locally-acquired cases were reported. No travel-related cases of CHIK were reported in 2023; no locally-acquired cases of CHIK have ever been reported in Georgia.


Reported Onset Month of WNV Cases, Georgia 2023
cases
12
11
10
9
8
7
6
5
4
3
2
1
0
Asymptomatic
Neuroinvasive
Febrile illness
Unknown
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEP
OCT
NOV
1
1
2
1
1
2
9
1
3
4
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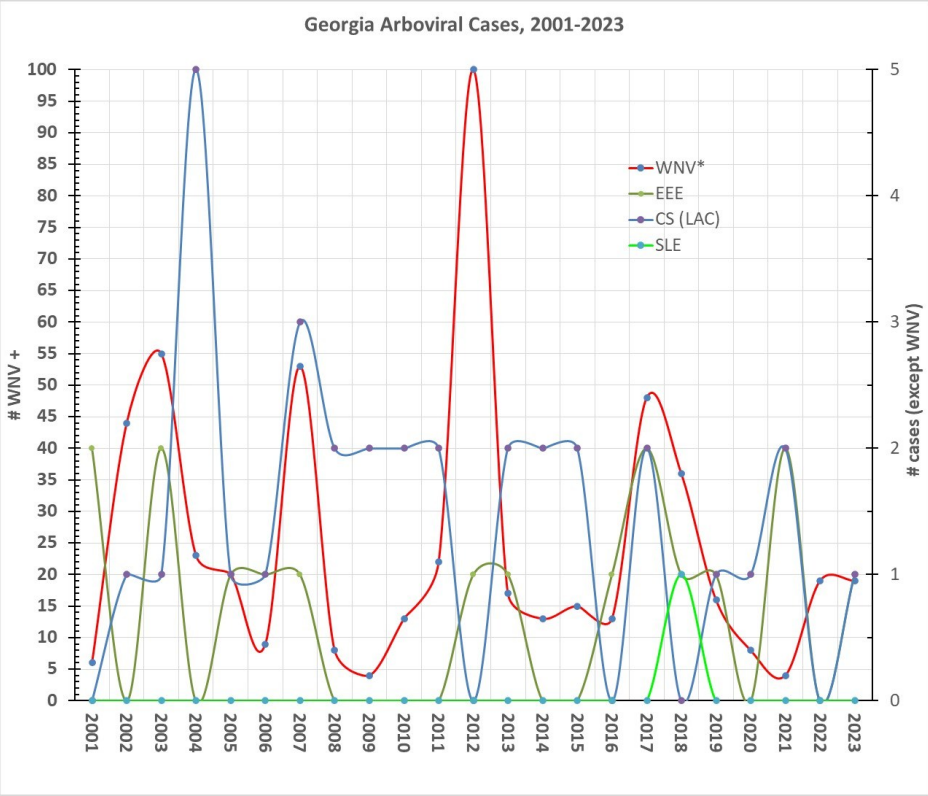
1
1



*Does not include asymptomatic cases

	# cases (including asymptomatic), 2023			
District	**CS (LAC)**	**EEE**	**WNV**	**TOTAL**
1-1				0
1-2			2	2
2-0	1			1
3-(1,2,3,4,5)			15	15
4-0			1	1
5-1				0
5-2			1	1
6-0			1	1
7-0			6	6
8-1				0
8-2		1	1	2
9-1				0
9-2			1	1
10-0				0
TOTAL	1	1	28	30

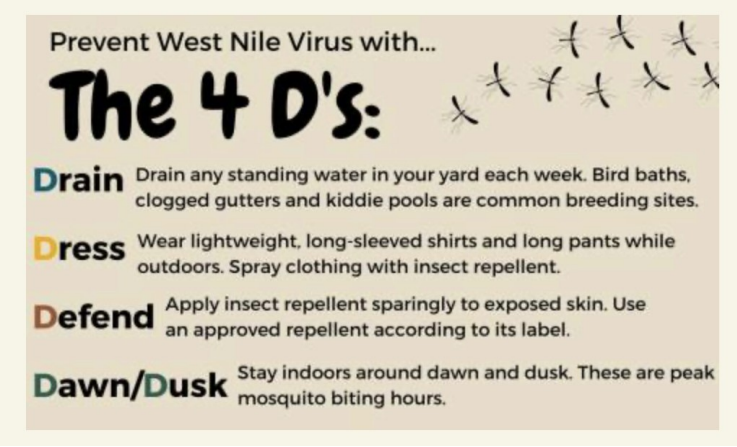
Table 3: Age Ranges, WNV 2023

age range	WNND	WNF	unknown	Asymptomatic
0-10				
11-20	1			
21-30	1			
31-40	1			2
41-50	1	2		3
51-60	3			4
61-70	5			
71-80	5			
>80				
TOTAL	**17**	**2**	**0**	**9**

Clinical Syndromes, 2023			
Diagnosis	**EEE**	**CS (LAC)**	**WNV**
Asymptomatic			9
Encephalitis			10
Fever			2
Meningitis		1	
other, neuroinvasive	1		7
unknown			

Table 1: Clinical Syndromes, 2023

Arbovirus	Month of Onset	County of Residence	Clinical Syndrome	Fatality	# cases
West Nile	Feb	Clayton	Other Neuroinvasive Presentation		1
	Apr	Decatur	Other Neuroinvasive Presentation		1
	Jul	Cherokee	Febrile illness		1
		Houston	Asymptomatic		1
		Muscogee	Asymptomatic		1
			Encephalitis - Including Meningoencephalitis		1
	Aug	Cobb	Encephalitis - Including Meningoencephalitis	1	2
		DeKalb	Encephalitis - Including Meningoencephalitis		1
		Fulton	Encephalitis - Including Meningoencephalitis		4
		Muscogee	Asymptomatic		1
			Other Neuroinvasive Presentation	1	2
		Troup	Asymptomatic		1
	Sep	Cherokee	Asymptomatic		1
		Cobb	Asymptomatic		1
		DeKalb	Encephalitis - Including Meningoencephalitis		1
			Other Neuroinvasive Presentation		2
		Fulton	Febrile illness		1
		Muscogee	Asymptomatic		1
		Richmond	Encephalitis - Including Meningoencephalitis		1
	Oct	Brantley	Other Neuroinvasive Presentation		1
		Gwinnett	Asymptomatic		1
	Nov	Gwinnett	Asymptomatic		1



Cases by Year (includes asymptomatic cases*)				
Year	EEE	CS (LAC)	SLE	WNV
2001	2			6
2002		1		45
2003	2	1		55
2004		5		23
2005	1	1		24
2006	1	1		11
2007	1	3		55
2008		2		12
2009		2		6
2010		2		14
2011		2		25
2012	1			117
2013	1	2		20
2014		2		13
2015		2		15
2016	1			13
2017	2	2		63
2018	1		1	38
2019	1	1		16
2020		1		12
2021	2	2		5
2022				23
2023	1	1		28
Grand Total	**17**	**33**	**1**	**639**

Foodborne: Each year, 1 in 6 Americans get sick from eating contaminated food. Eating or drinking something unsafe, such as unpasteurized (raw) milk, undercooked meat or eggs, or raw fruits and vegetables that are contaminated with feces from an infected animal. Contaminated food can cause illness in people and animals, including pets.

Waterborne: Drinking or coming in contact with water that has been contaminated with feces from an infected animal.

Zoonotic Diseases

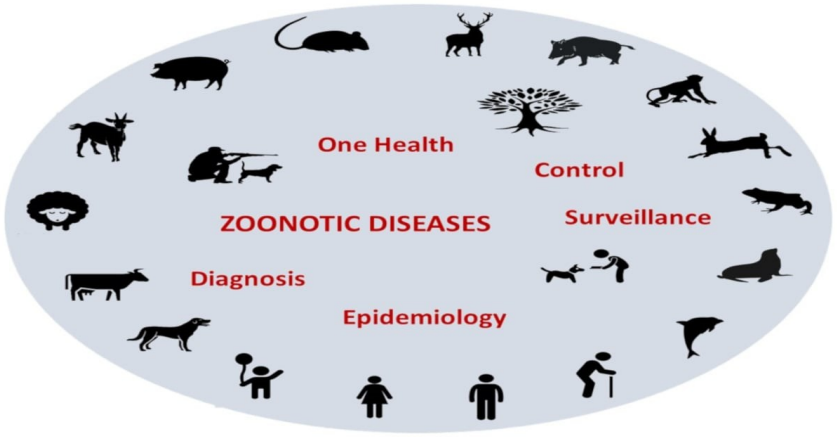
Zoonotic diseases are very common, both in the United States and around the world. Scientists estimate that more than 6 out of every 10 known infectious diseases in people can be spread from animals, and 3 out of every 4 new or emerging infectious diseases in people come from animals.

Because of the close connection between people and animals, it's important to be aware of the common ways people can get infected with germs that can cause zoonotic diseases. These can include:

Direct contact: Coming into contact with the saliva, blood, urine, mucous, feces, or other body fluids of an infected animal. Examples include petting or touching animals, and bites or scratches.

Indirect contact: Coming into contact with areas where animals live and roam, or objects or surfaces that have been contaminated with germs. Examples include aquarium tank water, pet habitats, chicken coops, barns, plants, and soil, as well as pet food and water dishes.

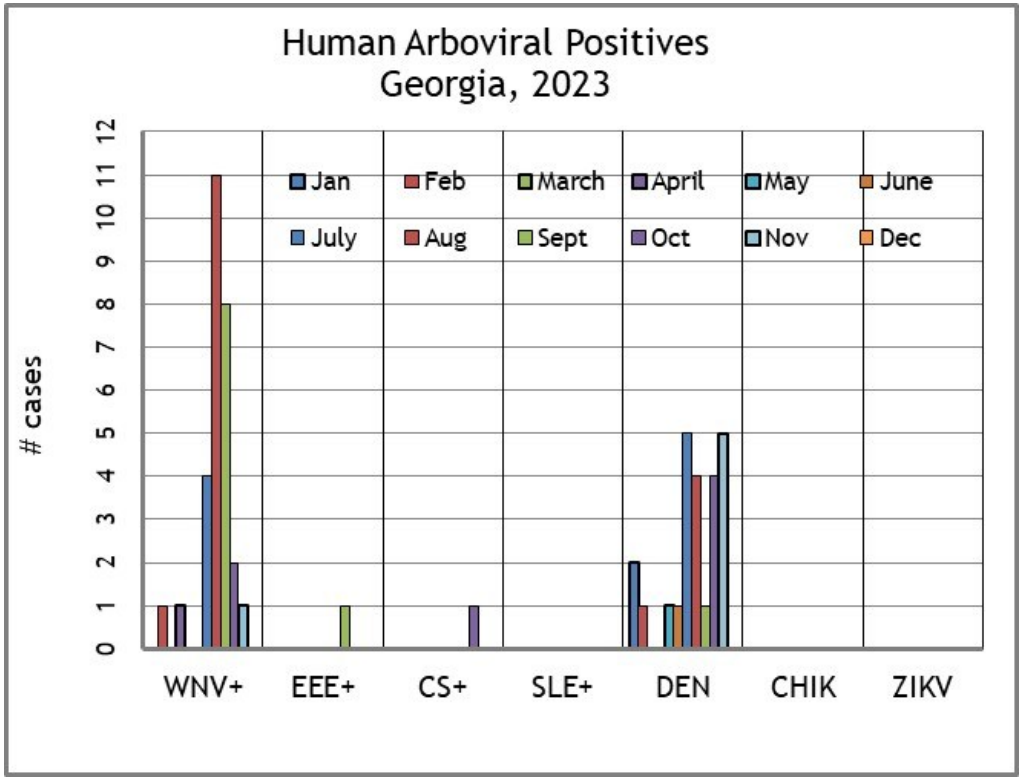
Vector-borne: Being bitten by a tick, or an insect like a mosquito or a flea.



Exotic Mosquito-Borne Diseases

The emergence of West Nile virus in the United States in 1999 dramatically illustrated the vulnerability of the United States to exotic vector-borne diseases. The sociologic, environmental, and technologic drivers of vector-borne disease emergence globally and in the United States, such as expanded travel and trade, changing land use, human population growth, urbanization, and climate change, are well known and many are accelerating (Kilpatrick and Randolph, 2012; Sutherst, 2004). As such, a bewildering array of vector-borne problems has confronted the United States in recent years. New pathogens, such as the chikungunya virus, have come from abroad (Leparc-Goffart et al., 2014). Other endemic pathogens, such as Lyme disease, have markedly increased in incidence and geographic distribution (Bacon et al., 2008). Still others, such as the Heartland and Bourbon viruses, have been newly discovered, in part, by combining traditional microbiological methods with technological advances in genetic sequencing (Kosoy et al., 2015; McMullan et al., 2012). It is evident that emerging vector-borne diseases will continue to tax our public health and medical care systems for years to come. The question remains whether we will be prepared.

EMERGING VECTOR-BORNE DISEASES IN THE UNITED STATES: WHAT IS NEXT, AND ARE WE PREPARED? - Global Health Impacts of Vector-Borne Diseases - NCBI Bookshelf (nih.gov)



TRAVEL-ASSOCIATED CASES, 2023

Exotic Viruses - County of Origin			
Virus	**County of Origin**	**Month of Onset**	**# cases**
DENGUE	**ANTIGUA AND BARBUDA**	November	1
	BAHAMAS	January	1
	BELIZE	November	1
	CUBA	July	1
	DOMINICAN REPUBLIC	August	1
		October	2
	HONDURAS	August	1
	INDIA	July	1
		October	1
		November	1
	JAMAICA	July	1
		September	1
		November	1
	MEXICO	January	1
		February	1
		June	1
		July	1
		August	1
	PERU	May	1
	THAILAND	October	1
	VENEZUELA, BOLIVARIAN REPUBLIC OF	November	1
	Unknown	July	1
		August	1

Veterinary Data

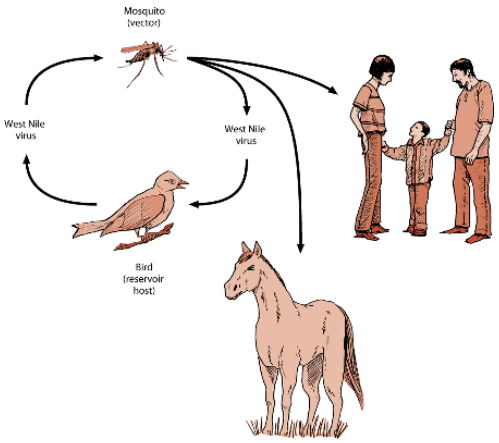
No horses tested positive for WNV in 2023. The number of reported cases of WNV in horses decreased rapidly after 2002, likely due to increased immunity, increased vaccination, and/or decreased testing, but had lately begun to increase again, although somewhat sporadically.

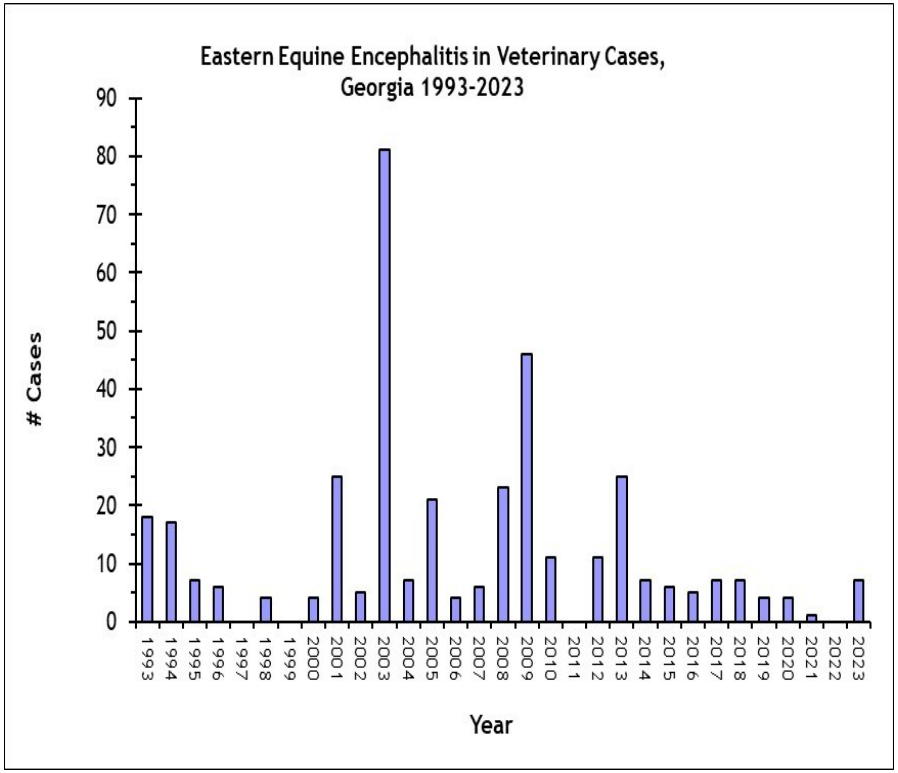
Seven horses tested positive for EEE in 2023. Eastern equine encephalitis is endemic in the Coastal and Coastal Plains areas of Georgia. During an average year, four or five EEE+ horses are reported from these areas. The true number of horse cases is probably higher, and lack of reporting is due primarily to under-testing, although subclinical infections can occur with EEE.

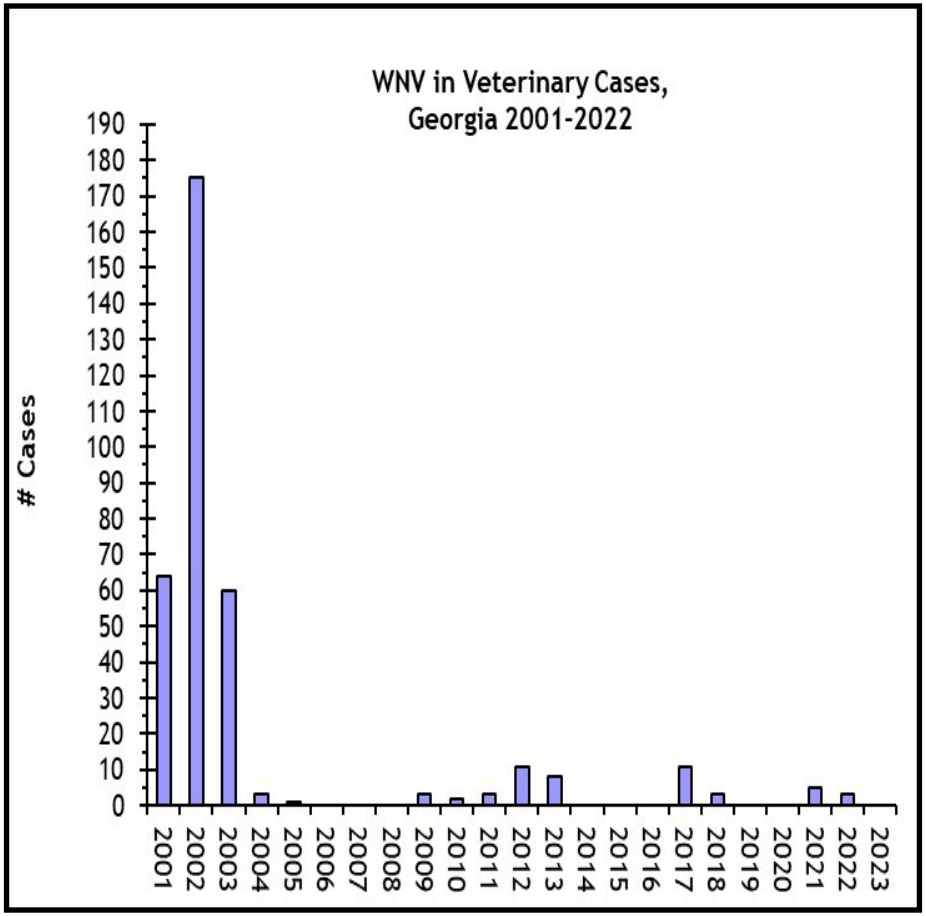
Vaccinating at the proper time of the year against EEE and WNV is critical to protecting horses from the potentially fatal mosquito-borne diseases.

year	WNV	EEE
2001	64	25
2002	175	5
2003	60	81
2004	3	7
2005	1	21
2006		4
2007		6
2008		23
2009	3	46
2010	2	11
2011	3	
2012	11	11

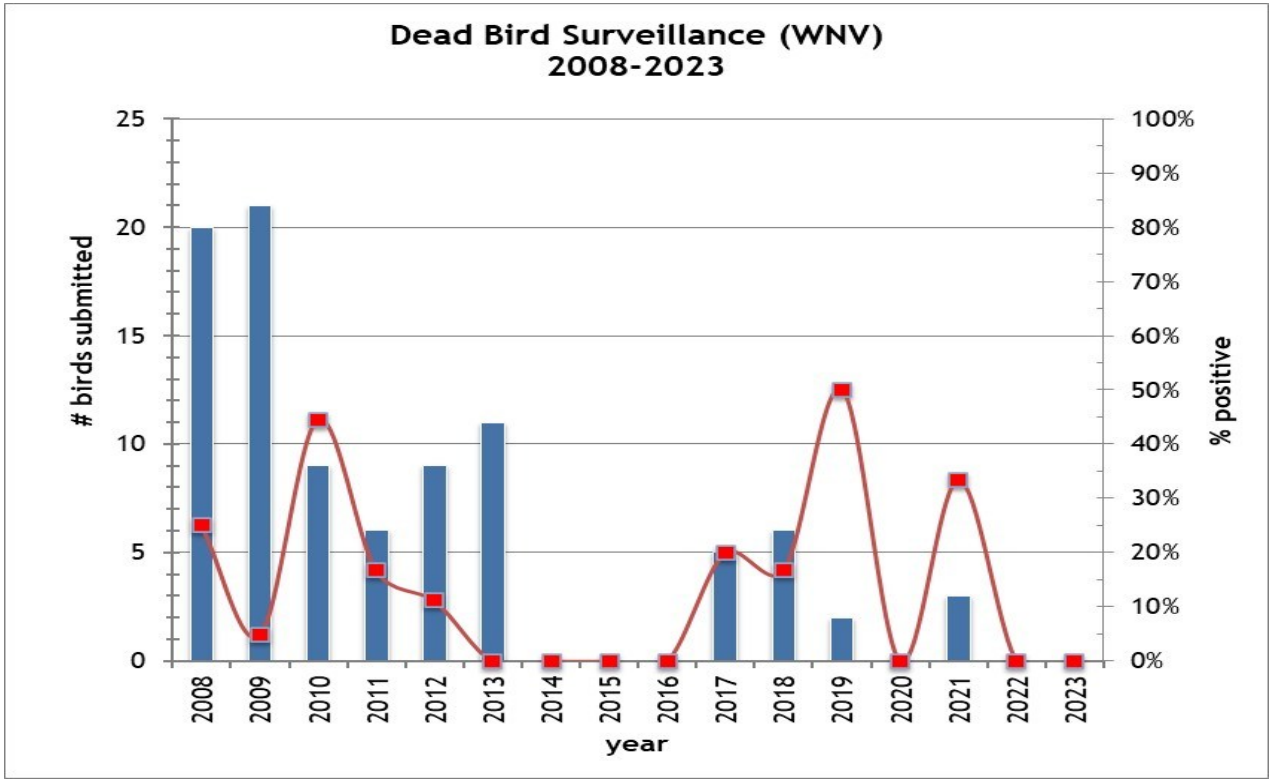
year	WNV	EEE
2013	8	25
2014		7
2015		6
2016		5
2017	11	7
2018	3	7
2019		4
2020		4
2021	5	1
2022	3	
2023		7







Dead Bird Surveillance



year	WNV+	total	% positive
2001	322	1566	20.6%
2002	931	2421	38.5%
2003	478	2131	22.4%
2004	105	581	18.1%
2005	23	311	7.4%
2006	15	281	5.3%
2007	10	97	10.3%
2008	5	20	25.0%
2009	1	21	4.8%
2010	4	9	44.4%
2011	1	6	16.7%
2012	1	9	11.1%
2013		11	
2014			
2015			
2016			
2017	1	5	20.0%
2018	1	6	16.7%
2019	1	2	50.0%
2020			
2021	1	3	33.3%
2022			
2023			

As of 2012, federal funding was no longer available to test birds. Submission of dead birds had already decreased from a high of 2421 birds submitted to SCWDS for testing in 2002, to 2 birds submitted in 2019.

In 2023, no birds were reported as submitted for testing.

Dead bird surveillance continues to lose ground as a surveillance tool, and even more so now when no funding is available at the State level to support testing; most counties do not have the resources to pick up and ship birds for testing in any case. Bird testing does continue to have some utility however, esp where mosquito surveillance data are not available. In addition, positive dead bird reports can be used to trigger public education messages reminding people to wear repellent and to dump out standing water.

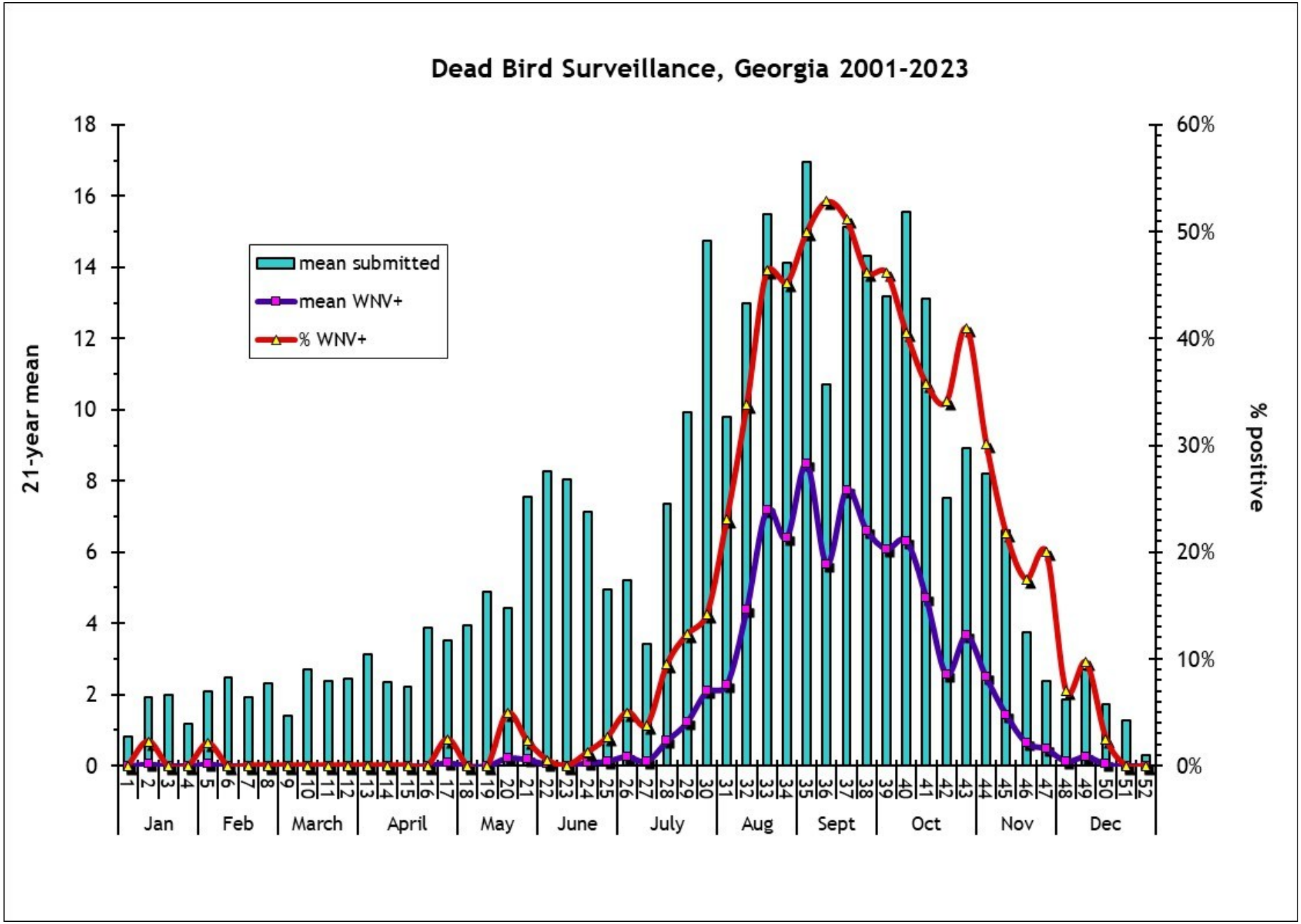
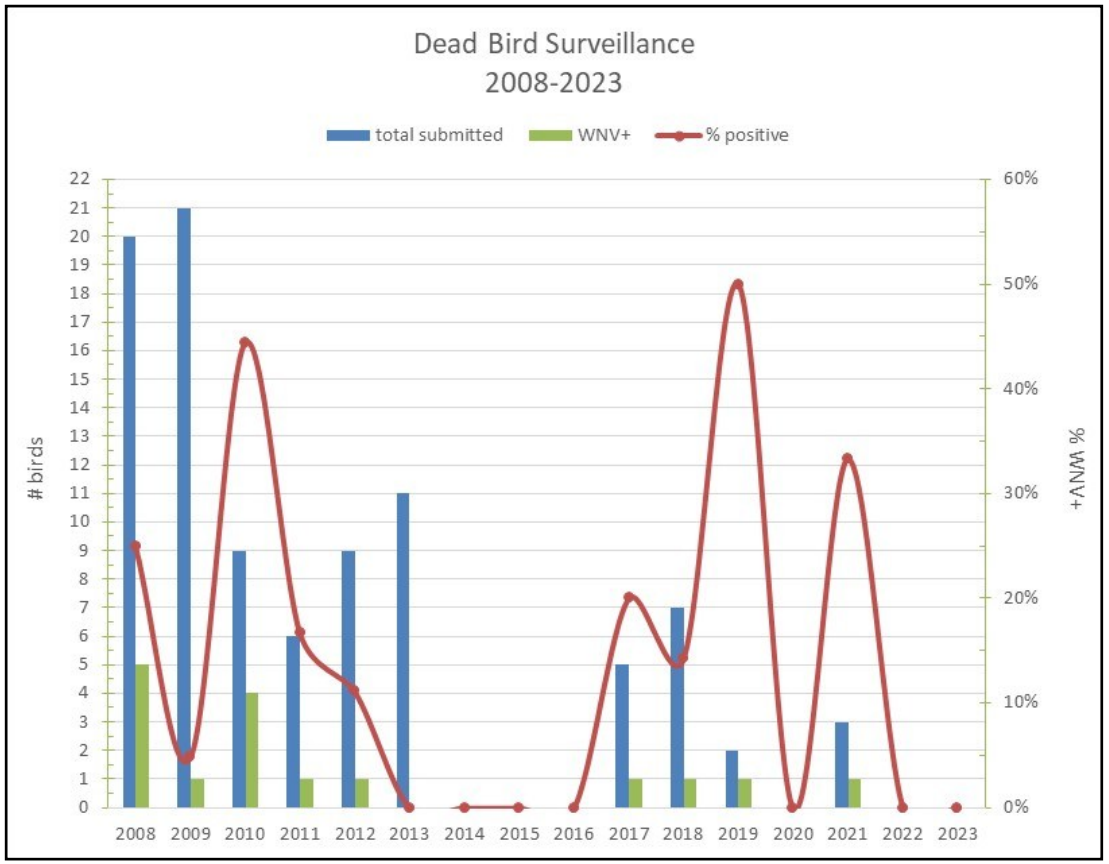
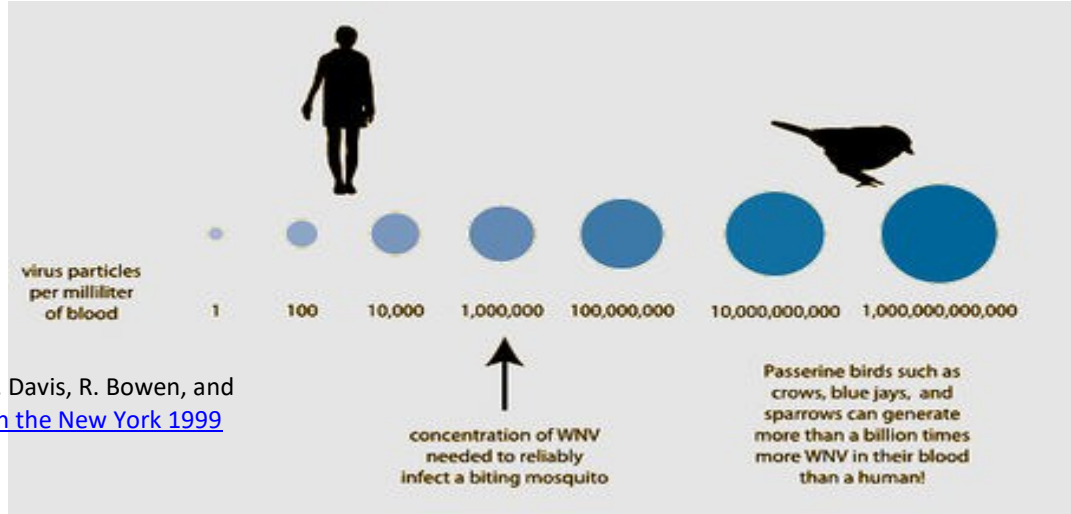

Dead Bird Surveillance, Georgia 2001-2023
21-year mean
% positive
mean submitted
mean WNV+
% WNV+
0
2
4
6
8
10
12
14
16
18
0%
10%
20%
30%
40%
50%
60%
Jan
Feb
March
April
May
June
July
Aug
Sept
Oct
Nov
Dec

Table of West Nile Virus host competency of 23 species of birds. A larger index number correlates to higher amounts of viral load in concurrence with long durations of viremia. Data adapted from Komar et al. 2003.

Species	Reservoir Competence Index
Blue Jay	2.55
Common Grackle	2.04
House Finch	1.76
American Crow	1.62
House Sparrow	1.59
Ring-billed Gull	1.26
Black-billed Magpie	1.08
American Robin	1.08
Red-winged Blackbird	0.99
American Kestrel	0.93
Great Horned Owl	0.88
Killdeer	0.87
Fish Crow	0.73
Mallard	0.48
European Starling	0.22
Mourning Dove	0.19
Northern Flicker	0.06
Canada Goose	0.03
Rock Dove	0
American Coot	0
Ring-necked Pheasant	0
Monk Parakeet	0





Komar, N., S. Langevin, S. Hinten, N. Nemeth, E. Edwards, D. Hettler, B. Davis, R. Bowen, and M. Bunning. 2003. Experimental Infection of North American Birds with the New York 1999 Strain of West Nile Virus. Emerging Infectious Diseases 9(3): 311-322.

Mosquito Surveillance

In 2012, due to funding cuts, mosquito testing was no longer supported by the State Department of Public Health. Counties testing mosquito pools in-house or holding contracts for testing continued doing mosquito surveillance and shared some of the test results with the GDPH. Unfortunately, data submitted to the GDPH are likely to be incomplete, making data analysis difficult and results suspect.

Seven counties sent mosquitoes for testing in 2023. A total of 7110 pools of mosquitoes (158035 individuals) were sent for testing in 2023, with results reported to the GDPH. Three species, *Culex quinquefasciatus* (104 pools), *Cx nigripalpus* (8 pools), and *Cx restuans* (2 pools) were found to be WNV+. Four pools of unidentified *Culex* spp also tested positive for WNV; these were likely to have been *Cx quinquefasciatus* as well. One pool tested positive for EEE.

County	vector species	# WNV+ pools
Chatham	*Culex spp.*	4
	Cx. nigripalpus	8
	Cx. quinquefasciatus	48
DeKalb	*Cx. quinquefasciatus*	27
	Cx. restuans	2
Fulton	*Cx. quinquefasciatus*	25
Lowndes	*Cx. quinquefasciatus*	4

Species	County	EEE+ pools
Cx quinquefasciatus	Chatham	1

2023 WNV+ pools

County	# mosquitoes submitted	# WNV+ pools	WNV MIR
Camden	7977		
Chatham	81471	60	0.74
Cook	40		
DeKalb	12751	29	2.27
Fulton	4940	25	5.06
Glynn	19236		
Lowndes	31620	4	0.13
TOTAL	**158035**	**118**	

Tested Mosquitoes (sum)

Species	3-2	3-5	8-1	9-1	Grand Total
Ae. albopictus			1	88	89
Ae. vexans				10	10
Aedes/Ochlerotatus spp.			1		1
An. crucians				23	23
Cq. perturbans			4003	204	4207
Cs. melanura			366	453	819
Culex spp.				2490	2490
Culiseta spp.				1	1
Cx. coronator				11	11
Cx. erraticus				2162	2162
Cx. nigripalpus			7464	2508	9972
Cx. quinquefasciatus	4938	11886	15963	83726	116513
Cx. restuans		864	218		1082
Cx. salinarius			1	42	43
Cx. territans		1			1
Ma. titillans			237		237
Oc. atlanticus				214	214
Oc. dupreei				16	16
Oc. infirmatus				74	74
Oc. sollicitans				2	2
Oc. taeniorhynchus				283	283
Oc. triseriatus				11	11
Ps. ferox				4	4
unknown				144	144
Grand Total	**4938**	**12751**	**28254**	**92466**	**138409**

In 2023, the first WNV+ mosquitoes were detected in Chatham County in late June. The last WNV+ pool was collected in Chatham in early October. Peaks in numbers of WNV+ pools occurred in August and September. All of the WNV+ mosquitoes were caught in gravid traps.

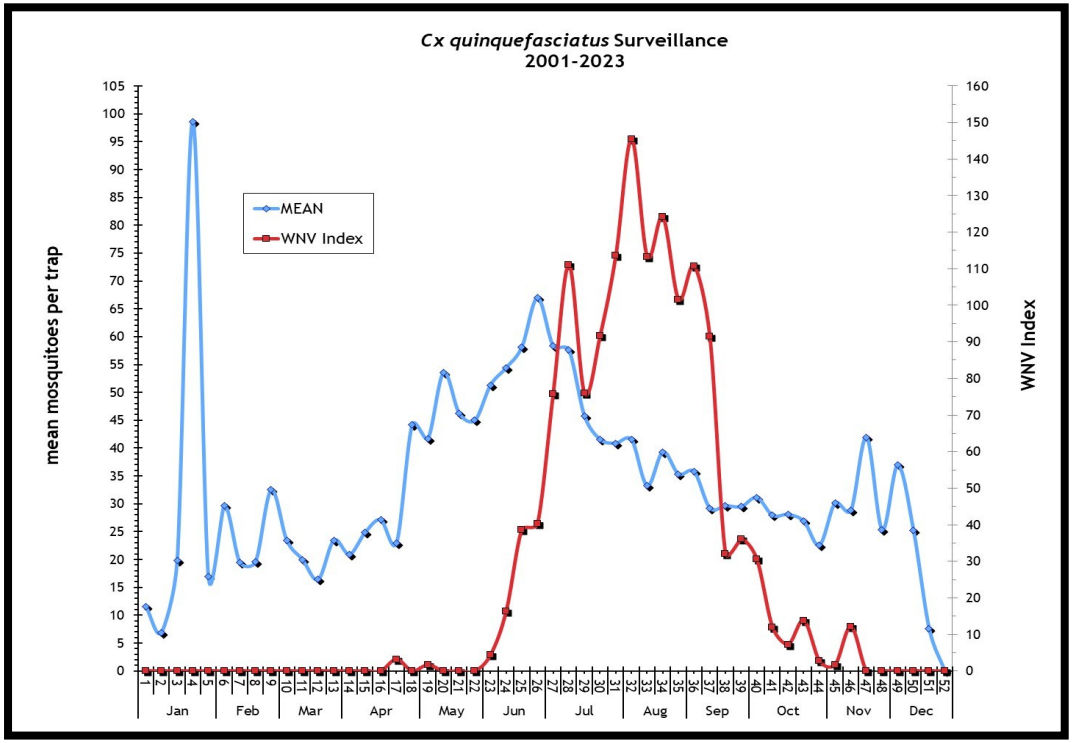
The Vector Index (VI) equals the MIR times the number of vectors per trap night . It is a Measure of infectivity that takes into account the following information:

- **Vector species composition** – Key species carrying West Nile virus in our region.
- **Vector species population density** – Vector abundance relative to trapping effort (vectors per trap night).
- **Vector species infection rate** – Proportion of vector population infected with WNV (MIR).

The VI is an objective method of following trends in mosquito infection rates, adjusted for mosquito abundance in the area.

The Minimum Infection Rate or MIR = (# WNV+ Pools/Total # Mosquitoes Tested) X 1000. The WNV Index is the MIR multiplied by the number of mosquitoes per trap night. An MIR of 0 suggests that there is no viral activity in the area. An MIR of 0.1 to 3.9 indicates that some viral activity is present, and increased vigilance and testing are needed. An MIR of 4.0 or above means that a high level of viral activity is present, human infections are imminent (if not already present), and prompt action is required.

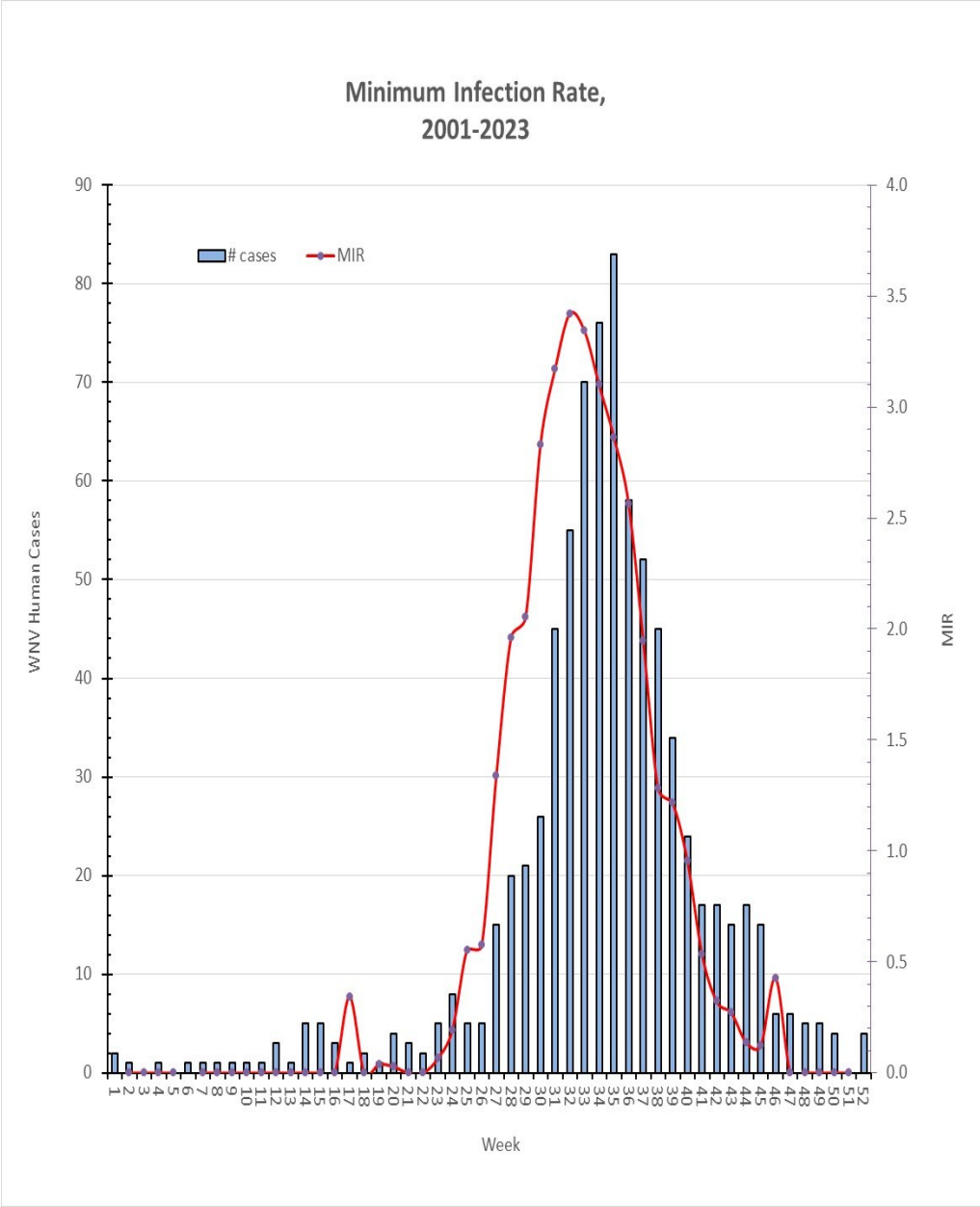
The monthly MIR for Georgia in 2023 ranged from 0.14 to 2.27, with an average of 0.75.



year	WNV Index	WNV+ Pools	human cases
2001	146.3	31	6
2002	106.6	57	37
2003	50.7	105	60
2004	40.7	126	24
2005	17.7	67	24
2006	31.5	81	10
2007	29.9	75	60
2008	25.3	50	12
2009	13.7	24	6
2010	47.7	99	14
2011	179.6	397	26
2012	64.3	125	117
2013	72.0	150	20
2014	43.6	56	13
2015	37.00	40	17
2016	22.80	36	13
2017	148.00	276	64
2018	202.30	310	38
2019	113.40	243	16
2020	24.60	59	12
2021	11.50	31	5
2022	59.60	100	23
2023	48.40	118	28

2001-2023	human cases	WNV+ mosquito pools	veterinary case	positive bird
total	622	2748	353	1900
mean/year	27.0	119.5	23.5	118.8

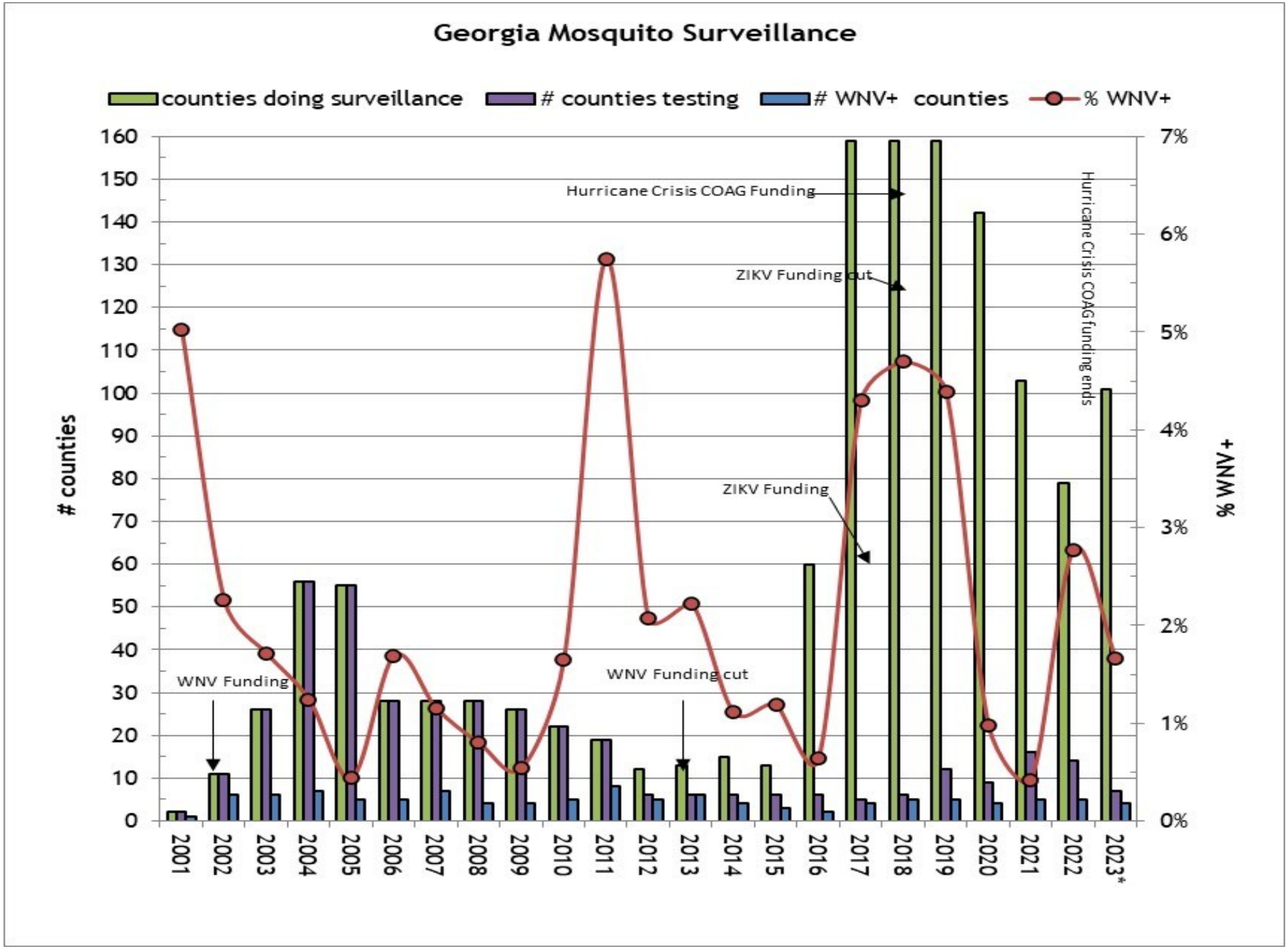
year	total pools	WNV+	% WNV+	human cases
2001	597	30	5.2%	6
2002	4032	91	1.4%	37
2003	6177	106	1.7%	60
2004	10161	126	1.2%	24
2005	15248	67	0.4%	24
2006	4785	81	1.7%	10
2007	6513	75	1.2%	60
2008	6383	51	0.8%	12
2009	4446	24	0.5%	6
2010	5990	99	1.7%	14
2011	7622	438	5.2%	26
2012	6042	125	2.1%	117
2013	7453	166	2.0%	20
2014	5038	56	1.1%	13
2015	3366	40	1.2%	17
2016	5620	36	0.6%	13
2017	6419	276	4.3%	64
2018	6599	310	4.7%	38
2019	5532	243	4.4%	16
2020	6015	59	1.0%	12
2021	7375	31	0.4%	5
2022	3611	100	2.8%	23
2023	7110	118	1.7%	28
MEAN	6179.7	119.5	2.1%	27.0
TOTAL	142134	2748	47.3%	622



year	WNV+ pools	EEE+ pools	counties doing surveillance	# counties testing	# WNV+ counties	total mosquito pools tested	% WNV+	Human WNV+
2001	30		2	2	1	597	5.0%	6
2002	91		11	11	6	4032	2.3%	36
2003	106	1	26	26	6	6177	1.7%	55
2004	126	2	56	56	7	10161	1.2%	23
2005	67	8	55	55	5	15248	0.4%	24
2006	81		28	28	5	4785	1.7%	11
2007	75		28	28	7	6513	1.2%	55
2008	51	1	28	28	4	6383	0.8%	12
2009	24		26	26	4	4446	0.5%	6
2010	99	3	22	22	5	5990	1.7%	14
2011	438		19	19	8	7622	5.7%	25
2012	125	3	12	6	5	6042	2.1%	117
2013	166	1	13	6	6	7453	2.2%	20
2014	56	2	15	6	4	5038	1.1%	13
2015	40		13	6	3	3366	1.2%	15
2016	36		60	6	2	5620	0.6%	13
2017	276	2	159	5	4	6419	4.3%	63
2018	310	3	159	6	5	6598	4.7%	38
2019	243		159	12	5	5532	4.4%	16
2020	59		142	9	4	6025	1.0%	12
2021	31	1	103	16	5	7357	0.4%	5
2022	100	2	79	14	5	3611	2.8%	23
2023	118	1	101	7	4	7110	1.7%	28

There are two general categories within which mosquito breeding habitats exist: natural mosquito breeding habitats and man-made mosquito breeding habitats. Female mosquitoes lay their eggs either on water or on soils that are periodically flooded. These breeding areas can be found in habitats that exist naturally, such as within a pond or flood plain, or in habitats that have been created by humans, such as bird baths, water-filled tires, or catch basins.

Container-breeding species tend to be asynchronous in their emergence, making their control difficult. Floodwater species tend to emerge all at once. These species are more easily control with typical mosquito control practices. There are, of course, a spectrum of emergence strategies between the two extremes.


Georgia Mosquito Surveillance
counties doing surveillance
counties testing
WNV+ counties
% WNV+
# counties
% WNV+
Hurricane Crisis COAG Funding
ZIKV Funding cut
Hurricane Crisis COAG funding ends
ZIKV Funding
WNV Funding
WNV Funding cut
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
160
0%
1%
2%
3%
4%
5%
6%
7%
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023*

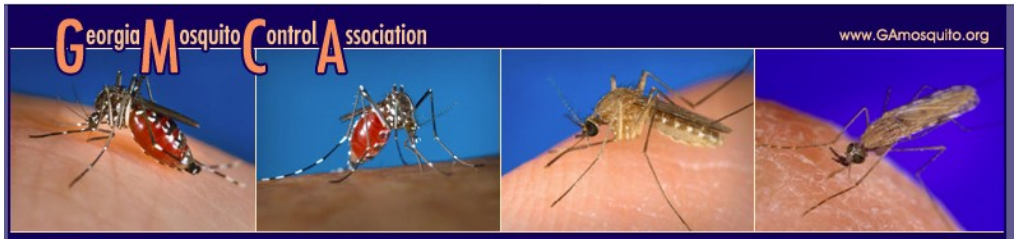
Mosquito Surveillance: Untested Mosquitoes

After the loss of WNV funding, mosquitoes collected during surveillance by the GDPH were no longer sent for testing. These mosquitoes are identified and the data are shared with the county mosquito control agency to assist with control efforts. ZIKV funding, followed by Hurricane Crisis CoAg funding allowed GDPH to create 5 Vector Surveillance Coordinator positions and hire a second entomologist in order to increase our ability to do surveillance and to respond to mosquito complaints and arboviral disease issues. Between 2017-2019, some level of surveillance was done in every county in Georgia. Due to loss of funding resulting in the loss of the Vector Surveillance Coordinators in August 2020, surveillance was done only in 101 counties in 2023.

Month	# mosquitoes
January	2381
February	1351
March	2935
April	1836
May	3770
June	3956
July	5026
August	1448
September	869
October	376
November	561
December	
Grand Total	24509

Month	# trap nights
January	124
February	83
March	108
April	91
May	142
June	141
July	133
August	73
September	82
October	50
November	44
December	
Grand Total	1071

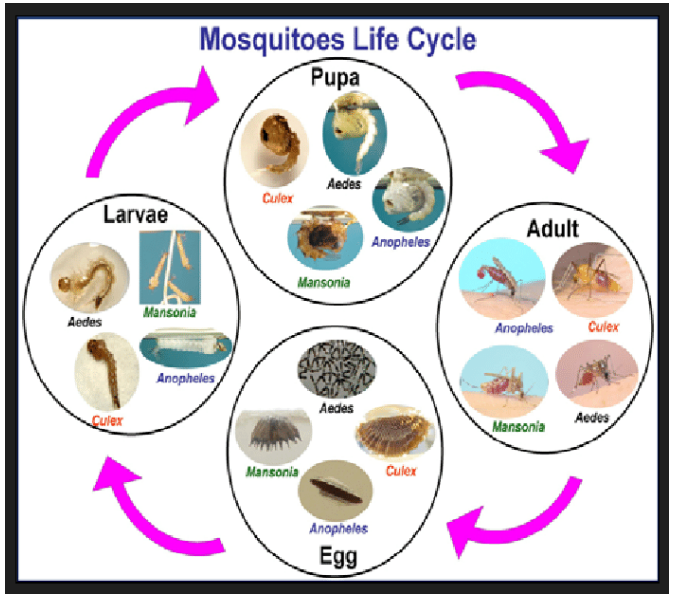
Month	# mosquitoes/trap night
January	19.20
February	16.28
March	27.18
April	20.18
May	26.55
June	28.06
July	37.79
August	19.84
September	10.60
October	7.52
November	12.75
December	
Mean	20.54



Untested Mosquitoes

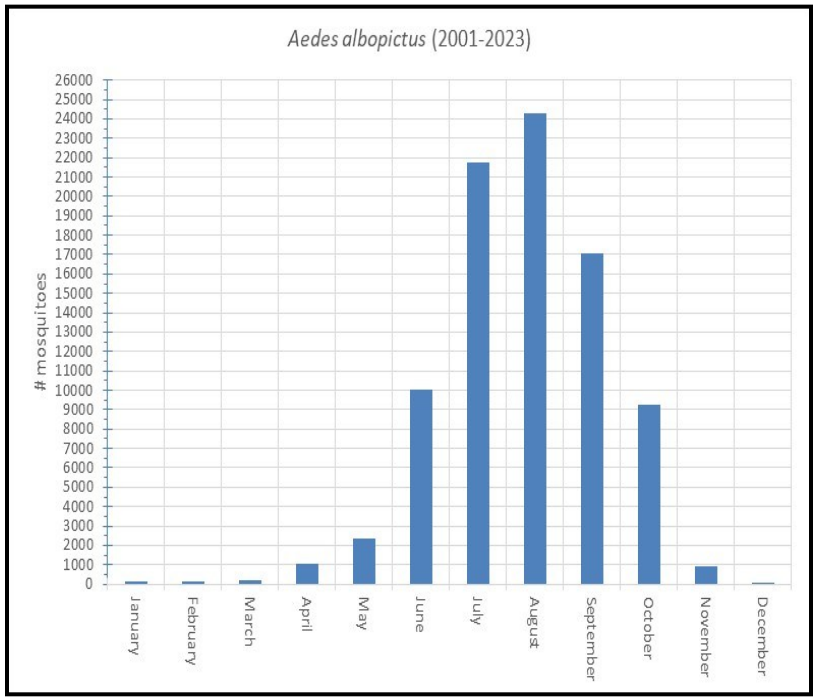
Species	# mosquitoes
Ae. aegypti	8
Ae. albopictus	1673
Ae. vexans	701
An. barberi	1
An. crucians	485
An. punctipennis	181
An. quadrimaculatus	58
Cq. perturbans	934
Cs. melanura	10
Cx. coronator	49
Cx. erraticus	351
Cx. nigripalpus	340
Cx. quinquefasciatus	14426
Cx. restuans	364
Cx. salinarius	1491
Cx. territans	27
Oc. atlanticus	183
Oc. canadensis	42
Oc. fulvus pallens	9
Oc. infirmatus	104
Oc. japonicus	157

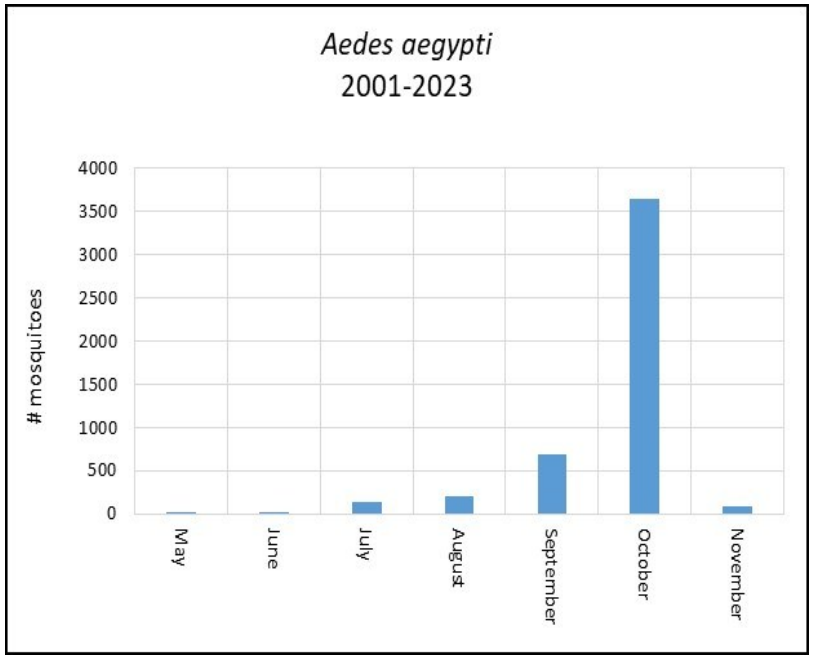
Species	# mosquitoes
Oc. sollicitans	47
Oc. taeniorhynchus	203
Oc. triseriatus	73
Oc. trivittatus	1
Or. signifera	3
Ps. ciliata	28
Ps. columbiae	106
Ps. ferox	470
Ps. horrida	940
Ps. howardii	27
Tx. rutilus	3
Ur. sapphirina	83



Tested Mosquitoes

species	# mosquitoes
Ae. albopictus	92
Ae. vexans	16
An. crucians	26
Cq. perturbans	4229
Cs. melanura	1133
Cx. coronator	11
Cx. erraticus	2263
Cx. nigripalpus	13587
Cx. quinquefasciatus	131084
Cx. restuans	1260
Cx. salinarius	62
Cx. territans	1
Ma. titillans	593
Oc. atlanticus	239
Oc. dupreei	16
Oc. infirmatus	130
Oc. sollicitans	2
Oc. taeniorhynchus	297
Oc. triseriatus	14
Ps. ferox	4



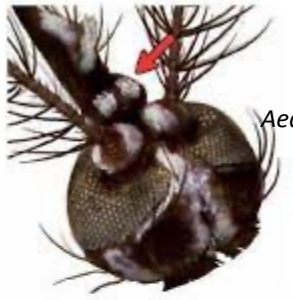


Aedes albopictus

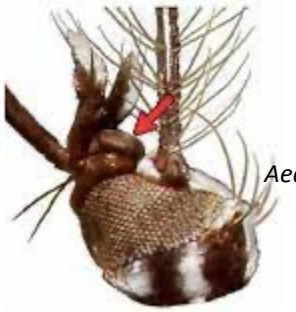
Year	earliest report	earliest surveillance
2001	late Aug	late Aug
2002	late April	late Jan
2003	early April	early Jan
2004	early April	late Feb
2005	mid March	early Jan
2006	late April	early March
2007	mid May	late March
2008	mid June	late March
2009	mid July	mid Feb
2010	mid June	late Feb
2011	mid June	late Feb
2012	mid April	early Jan
2013	early May	early Jan
2014	mid May	mid Feb
2015	late May	early March
2016	late March	early Jan
2017	mid April	early Jan
2018	early Jan	early Jan
2019	early Feb	early Feb
2020	early May	early May
2021	mid January	early Jan
2022	late March	early Jan
2023	late March	early Jan

Aedes aegypti

Aedes albopictus



Aedes aegypti



Aedes albopictus

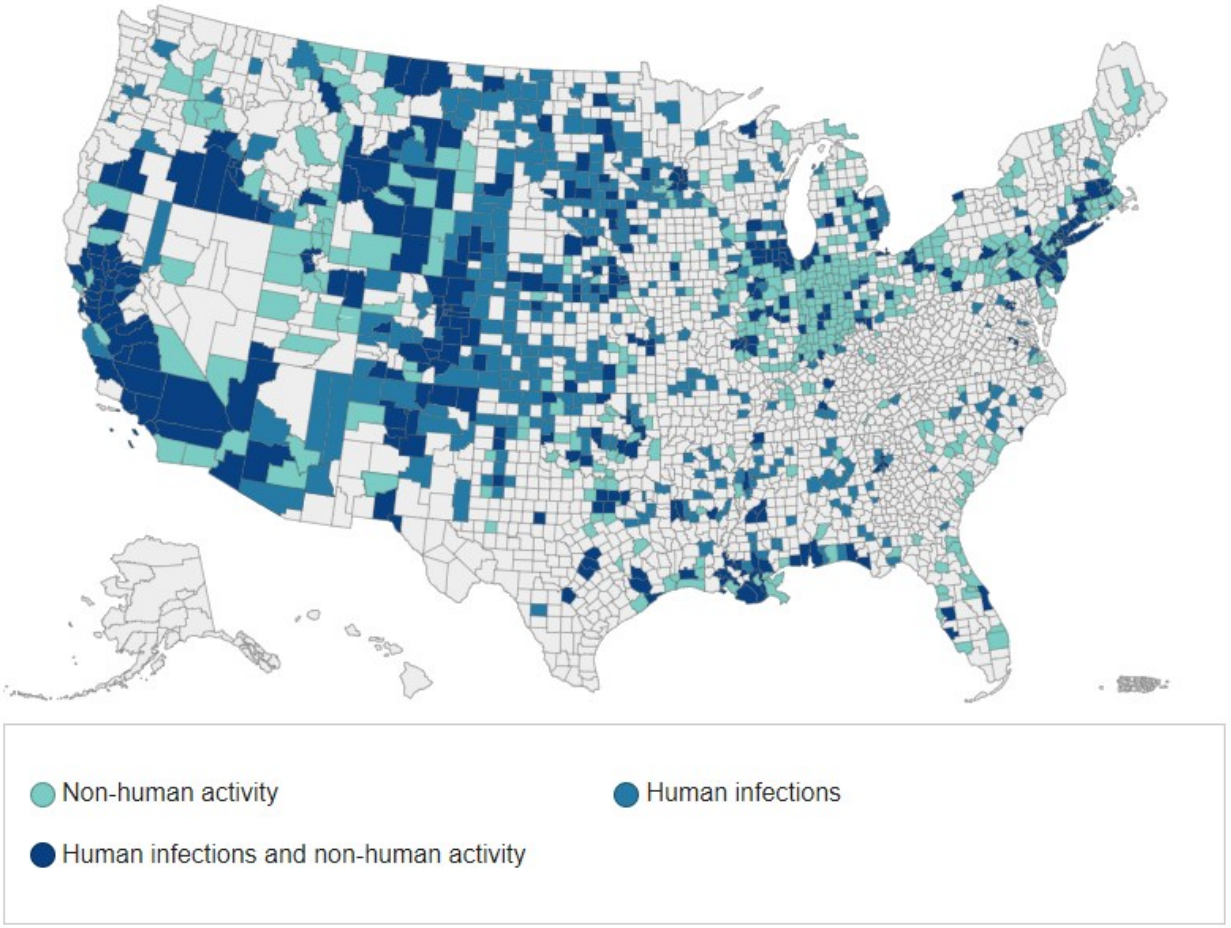
Aedes aegypti

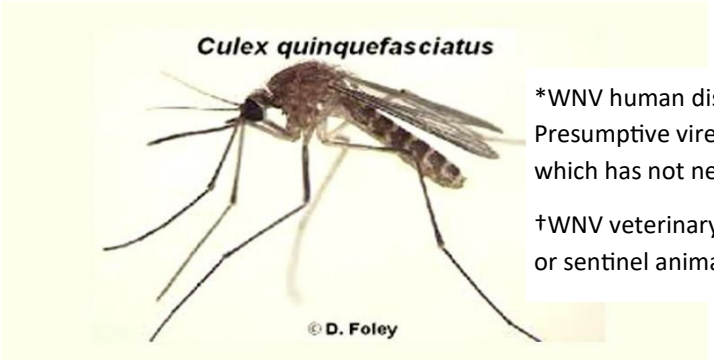
Year	earliest report	earliest surveillance
2005	late Oct	mid July
2006	early Sept	late July
2011	early Sept	early Sept
2012	mid July	mid July
2013	mid Aug	early July
2014	early July	early July
2015	early July	early July
2016	late July	late July
2017	early June	early June
2018	early May	mid Feb
2019	Late July	Late July
2020	early May	early May
2021	early Sept	early Sept
2022	mid Sept	mid May
2023	late Aug	late Aug

WNV Activity Map

WNV human and non-human activity by county of residence, 2023 as of January 9, 2024.

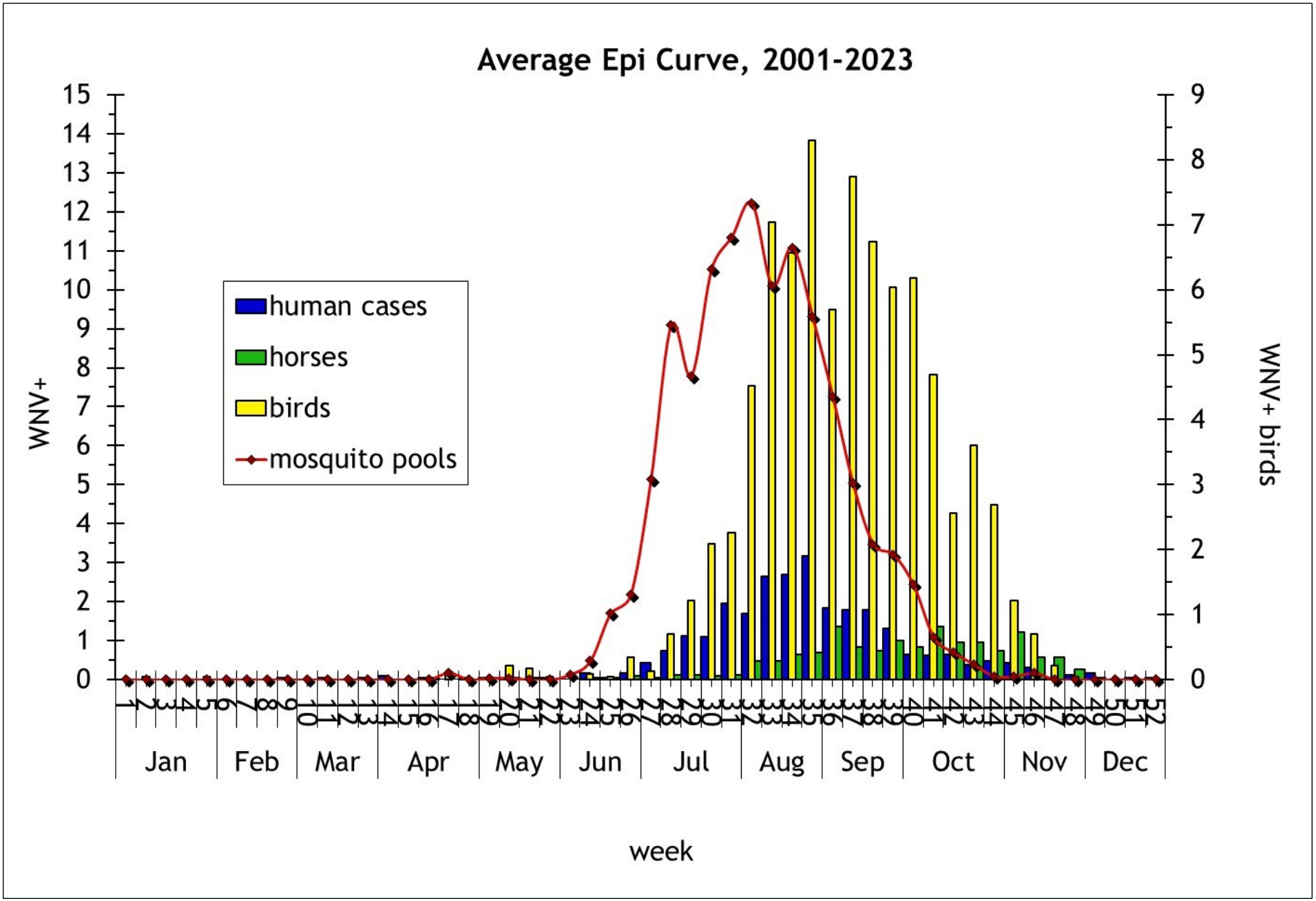
- Total Human Cases, 2023—2406
- Neuroinvasive Human Cases, 2023—1599
- States Reporting Cases, 2023—47

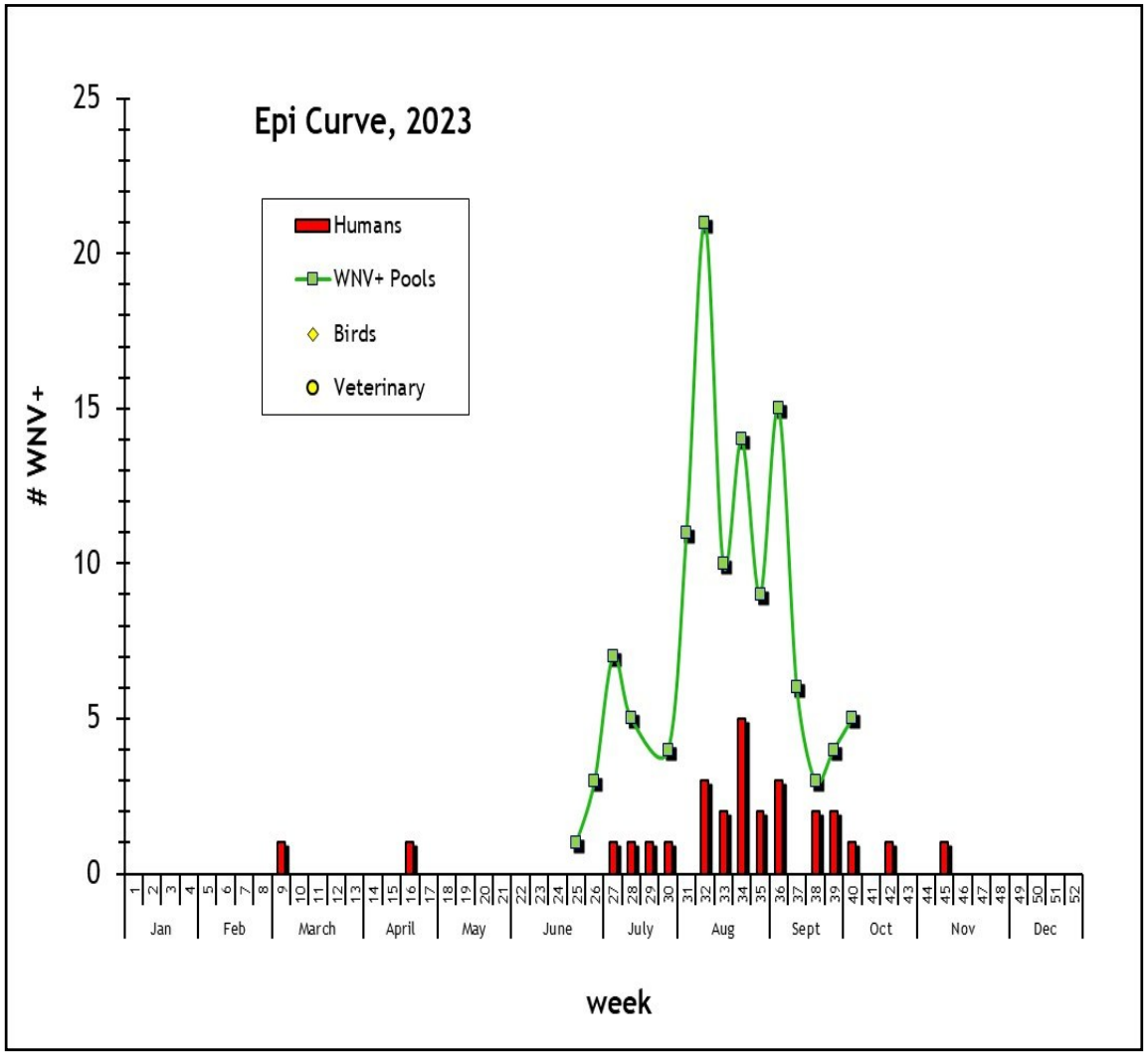




*WNV human disease cases or presumptive viremic blood donors. Presumptive viremic blood donors have a positive screening test which has not necessarily been confirmed.

†WNV veterinary disease cases, or infections in mosquitoes, birds, or sentinel animals.


Average Epi Curve, 2001-2023
WNV+
WNV+ birds
human cases
horses
birds
mosquito pools
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
week



The epidemic curve (epi curve) shows the progression of an outbreak over time.

THANK YOU to the district and county public and environmental health employees, mosquito control workers, interns, university students/staff, veterinarians, and healthcare providers who collected much of the data summarized in this document.

<u>GDPH Vector-Borne & Zoonotic Diseases Team</u>

- Rosmarie Kelly, PhD (Entomologist)
- "Tiffany" Thuy-vi Thi Nguyen, PhD (Entomologist)
- Shawna Stuck (Epidemiologist)
- Julie Gabel, DVM

Saltmarsh mosquito larvae, Glynn County, 2009

Constructing epidemic curves is a common and very important practice in epidemiology. An epidemic curve, also known as an epi curve or epidemiological curve, is a statistical chart used in epidemiology to visualize the onset of a disease outbreak. It can help with the identification of the mode of transmission of the disease. It can also show the disease's magnitude, whether cases are clustered or if there are individual case outliers, its trend over time, and its incubation period.

For more information on vector-borne diseases and epi curves, go to https://www.ncbi.nlm.nih.gov/books/NBK52945/.