2022—Arbovirus Final Report

Summary of Human West Nile Virus and Other Arboviral Infections, Georgia 2022

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 2002-2021 are available upon request.

In 2022, Georgia reported 19 cases of WNV and 4 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.

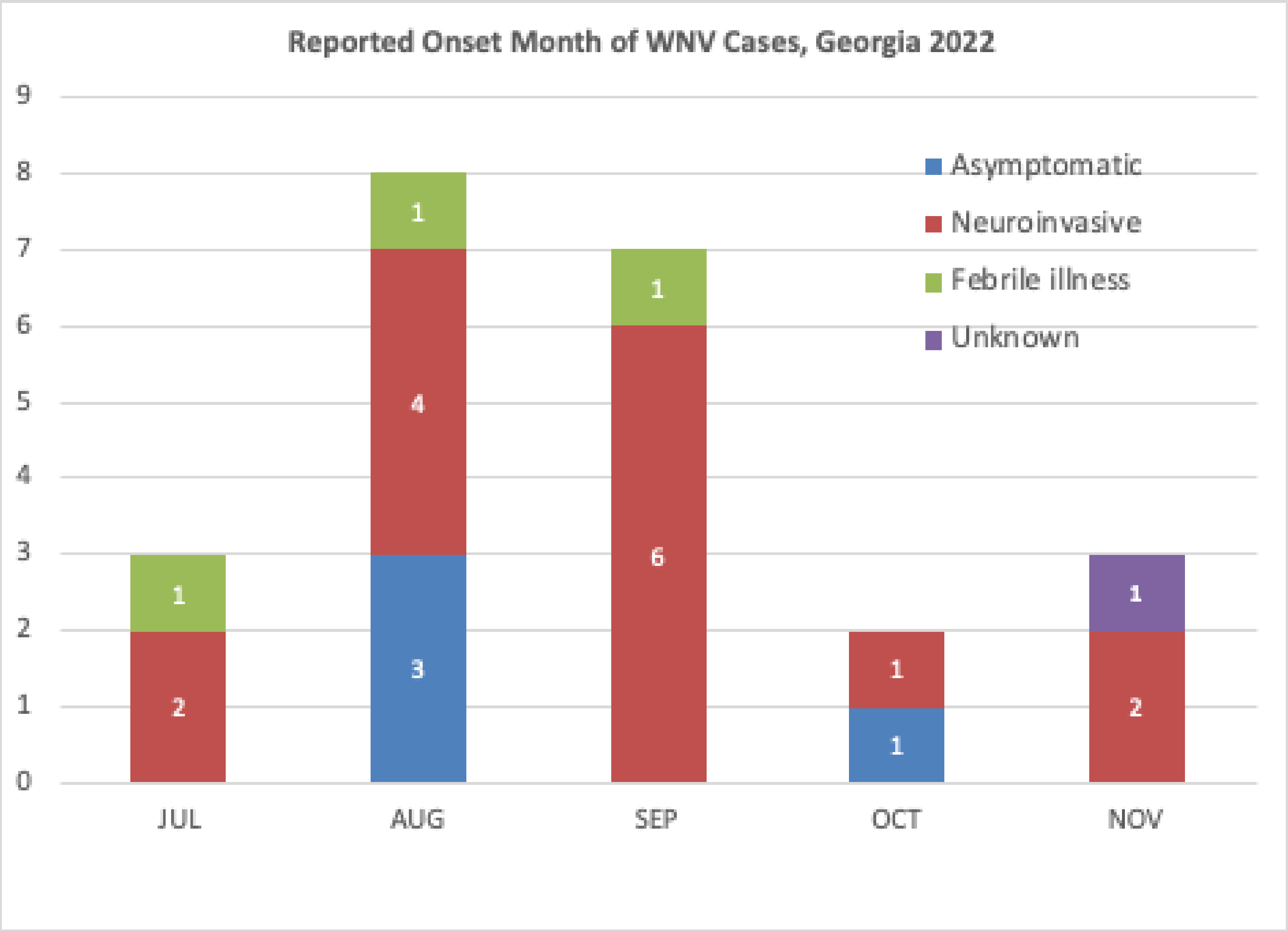
To date, 19 WNV disease cases were reported from 10 counties in 9 public health districts. Among these cases, 15 (79%) were neuroinvasive, all patients had illness onset during July-November and 13 (68%) cases were male. The average patient age of all WNV disease cases was 57.6 (range: 15-87) and the average patient age of all neuroinvasive cases was 60.6 (range: 25-87). Cases were reported between July and November, with a peak in August. The PVDs occurred in August and October. Their average age was 56.5 (range: 47-66). Two PVDs were male and 2 were female.

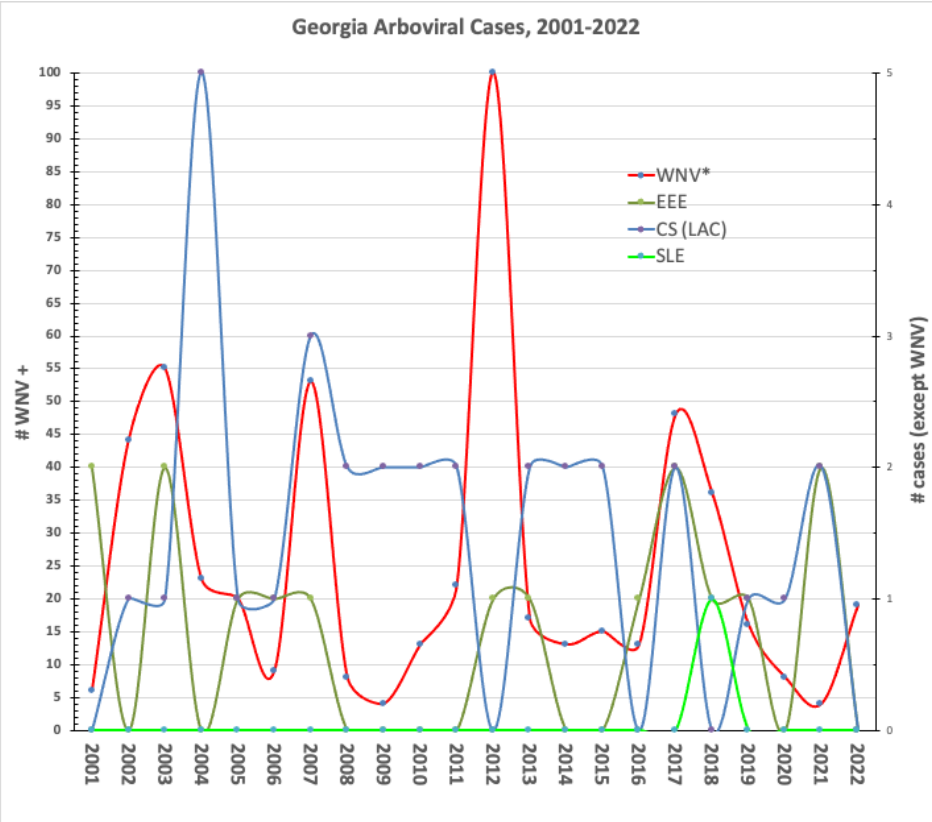
California serogroup (CS) viruses, including California encephalitis, Keystone, La Crosse, Jamestown Canyon (JCV), snowshoe hare, and trivittatus, belong to the Bunyaviridae family of viruses. In the United States, La Crosse virus (LACV) is the most common of the California serogroup viruses. There were no cases of California Serogroup, non-specified reported in Georgia in 2022.

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.

No cases of Eastern Equine Encephalitis (EEE) were reported in 2022.

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 2022, no travel-related cases of ZIKV were reported. To date there have been no locally transmitted (mosquito to human) cases of Zika in Georgia. Two travel-associated Dengue cases were reported in 2022, but no locally-acquired cases were reported. No travel-related cases of CHIK were reported in 2022; no locally-acquired cases of CHIK have ever been reported in Georgia.


Reported Onset Month of WNV Cases, Georgia 2022
9
8
7
6
5
4
3
2
1
0
Asymptomatic
Neuroinvasive
Febrile illness
Unknown
1
2
1
4
3
1
6
1
1
1
2
JUL
AUG
SEP
OCT
NOV



*Does not include asymptomatic cases

	# cases (including asymptomatic), 2022			
District	**CS (LAC)**	**EEE**	**WNV**	**TOTAL**
1-1			1	1
1-2			1	1
2-0				0
3- (1,2,3,4,5)			11	11
4-0				0
5-1				0
5-2			2	2
6-0			5	5
7-0				0
8-1			1	1
8-2				0
9-1			1	1
9-2			1	1
10-0				0
TOTAL	0	0	23	23

Table 3: Age Ranges, WNV 2022

age range	WNND	WNF	unknown	Asymptomatic
0-10				
11-20		1		
21-30	1			
31-40	1	1		
41-50				2
51-60	4			
61-70	6	1		2
71-80	2		1	
>80	1			
TOTAL	**15**	**3**	**1**	**4**

Table 2: Clinical Syndromes, 2022

	Virus		
Diagnosis	**EEE**	**CS(LAC)**	**WNV**
Asymptomatic			4
Encephalitis			5
Fever			3
Meningitis			4
other, neuroinvasive			6
unknown			1
	0	0	23

Table 1: Clinical Syndromes, 2022

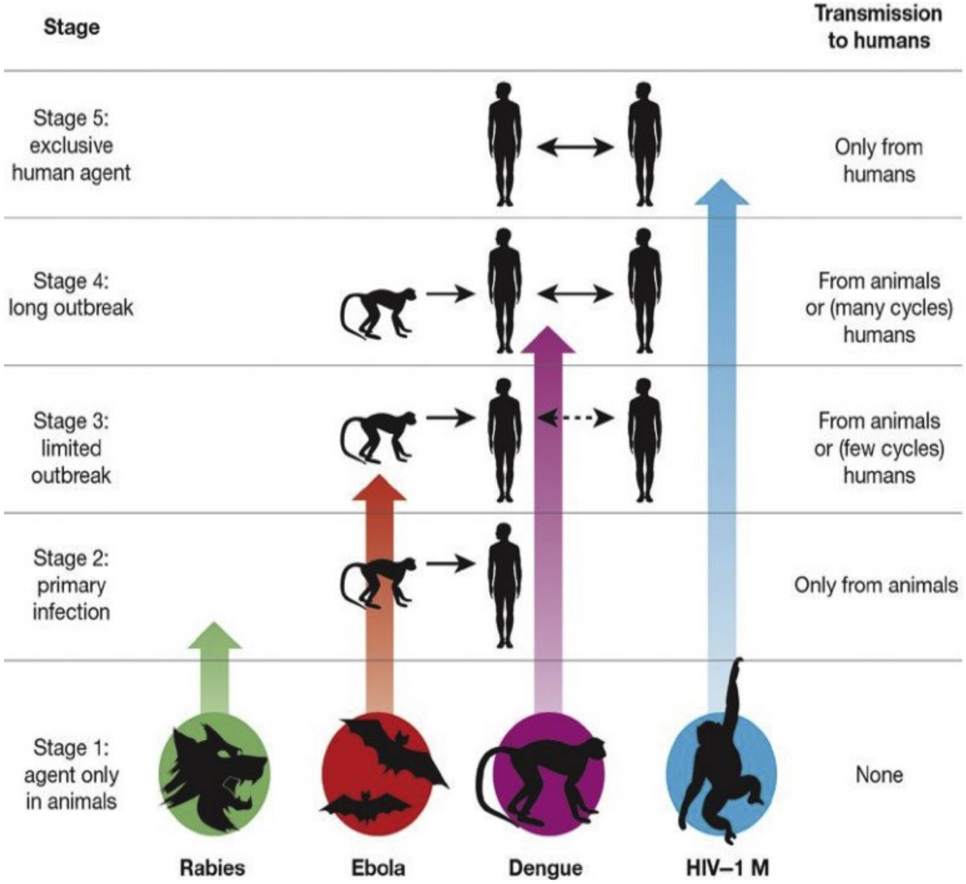
Arbovirus	Month of Onset	County of Residence	Clinical Syndrome	Fatality	# cases
WNV	July	Houston	Encephalitis - Including Meningoencephalitis		1
		Richmond	Febrile illness		1
			Other Neuroinvasive Presentation		1
	August	Ben Hill	Encephalitis - Including Meningoencephalitis	Yes	1
		Clayton	Asymptomatic		1
		DeKalb	Asymptomatic		1
		Fulton	Febrile illness		1
			Other Neuroinvasive Presentation		1
		McIntosh	Asymptomatic		1
		Richmond	Other Neuroinvasive Presentation		1
	September	Whitfield	Meningitis		1
		Cobb	Other Neuroinvasive Presentation		1
		Fulton	Febrile illness		1
			Meningitis		1
			Other Neuroinvasive Presentation		1
		Gwinnett	Encephalitis - Including Meningoencephalitis		1
		Houston	Encephalitis - Including Meningoencephalitis		1
		Richmond	Encephalitis - Including Meningoencephalitis	Yes	1
	October	Cobb	Meningitis		1
		Fulton	Asymptomatic		1
	November	Bacon	Meningitis		1
		Columbia	unknown		1
		Paulding	Other Neuroinvasive Presentation		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
Grand Total	**16**	**32**	**1**	**611**

Zoonotic Diseases

Zoonotic diseases are those diseases transmitted from animals to humans through direct contact or through food, water, or the environment, contributing to 61% of infectious organisms affecting humans. Zoonotic diseases may be categorized by their ability to spread among humans through 5 stages ranging from only spread among animals (stage 1) to fully human pathogens (stage 5). Fig. 1 illustrates the stages through which pathogens of animals evolve to cause human diseases.

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7096727/



Exotic Mosquito-Borne Diseases

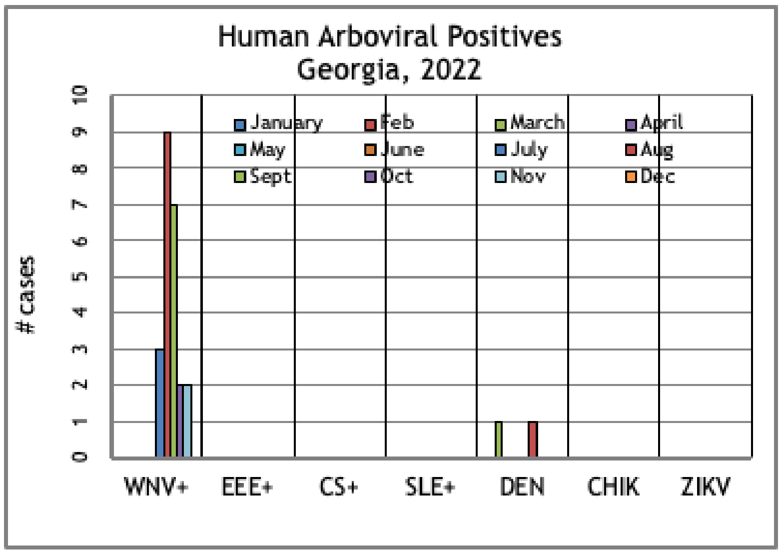
There are no comprehensive reports on the combined economic burden from vector-borne infections worldwide, except for single diseases. According to the WHO, vector-borne diseases represent 17% of all infectious diseases and cause >700,000 deaths annually, with 80% of the world's population at risk of being infected by one or more vector-borne diseases.

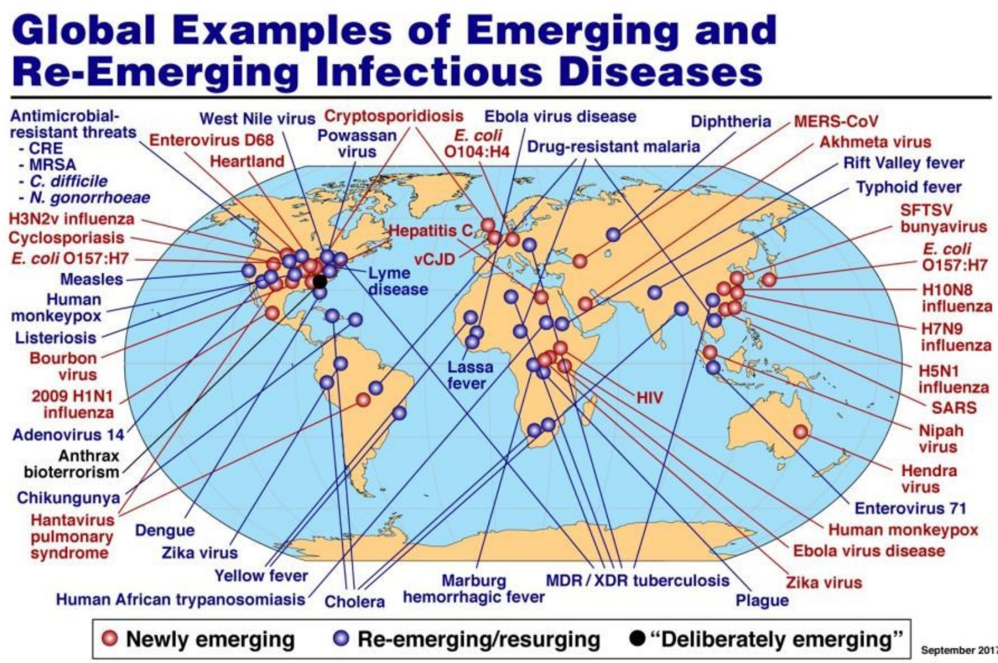
Of all known vector-borne diseases, mosquito-borne infectious diseases account for the highest number of reported cases, mortality, and disability-adjusted life-years (DALYs). As an example, the global cost of Dengue fever (DF) was estimated in 2013 to 8.9 billion US$ (95% uncertainty interval [UI] 3.7–19.7 billion). However, the economic costs from medical care, surveillance, vector control, and lost productivity associated with DF and Chikungunya (CHIK) is much higher, and accounts annually for ~39 billion USD. In that view, pandemics could be economically devastating, particularly for developing countries where the disease is endemic.

https://www.liebertpub.com/doi/10.1089/vbz.2020.2762

TRAVEL-ASSOCIATED CASES, 2022

Exotic Viruses - County of Origin			
Virus	**County of Origin**	**# cases**	**Month of Onset**
DEN	CUBA	1	Aug
DEN	EL SALVADOR	1	March





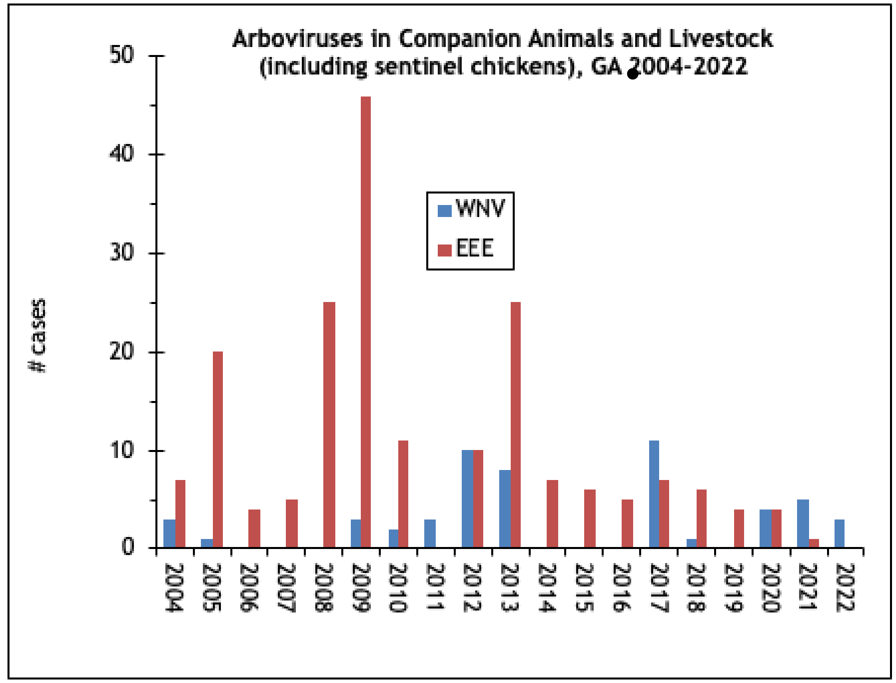
Veterinary Data

Three horses tested positive for WNV in 2022. 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.

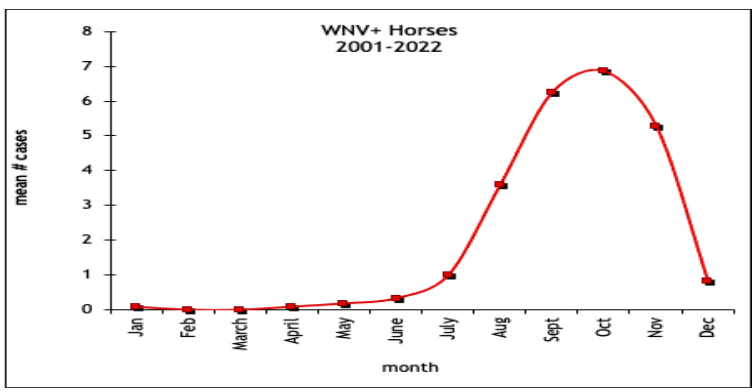
No horses tested positive for EEE in 2022. Eastern equine encephalitis is endemic in the Coastal and Coastal Plains areas of Georgia. During an average year, four or five EEE+ horses are reported from these areas. The true number of horse cases is probably higher, and lack of reporting is due primarily to under-testing, although subclinical infections can occur with EEE.

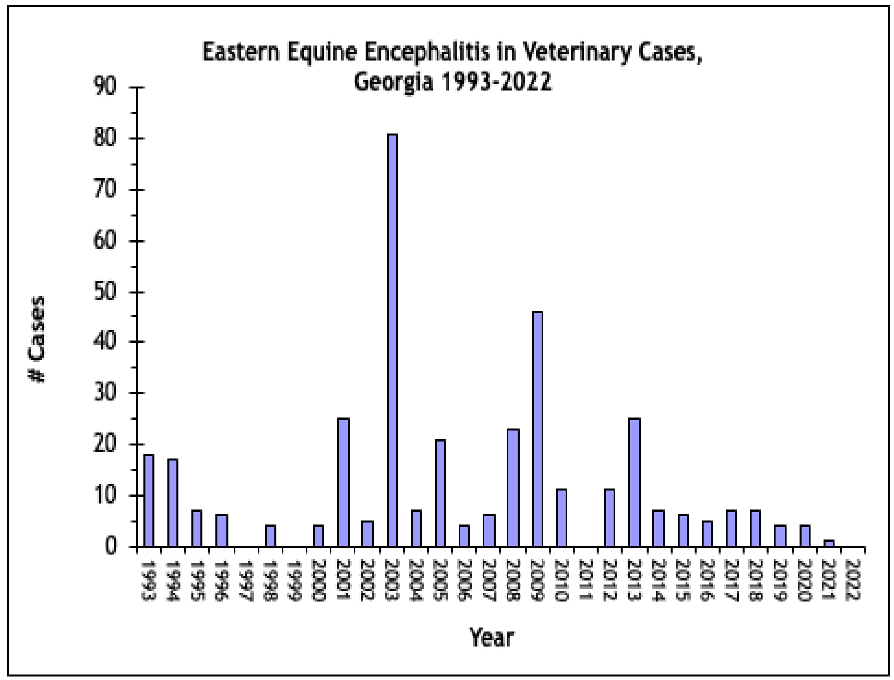
Vaccinating at the proper time of the year against EEE and WNV is critical to protecting horses from the potentially fatal mosquito-borne diseases.

year	WNV	EEE
2001	64	
2002	175	1
2003	60	80
2004	3	7
2005	1	20
2006		4
2007		5
2008		25
2009	3	46
2010	2	11
2011	3	
2012	10	10
2013	8	25
2014		7
2015		6
2016		5
2017	11	7
2018	1	6
2019		4
2020	4	4
2021	5	1
2022	3	

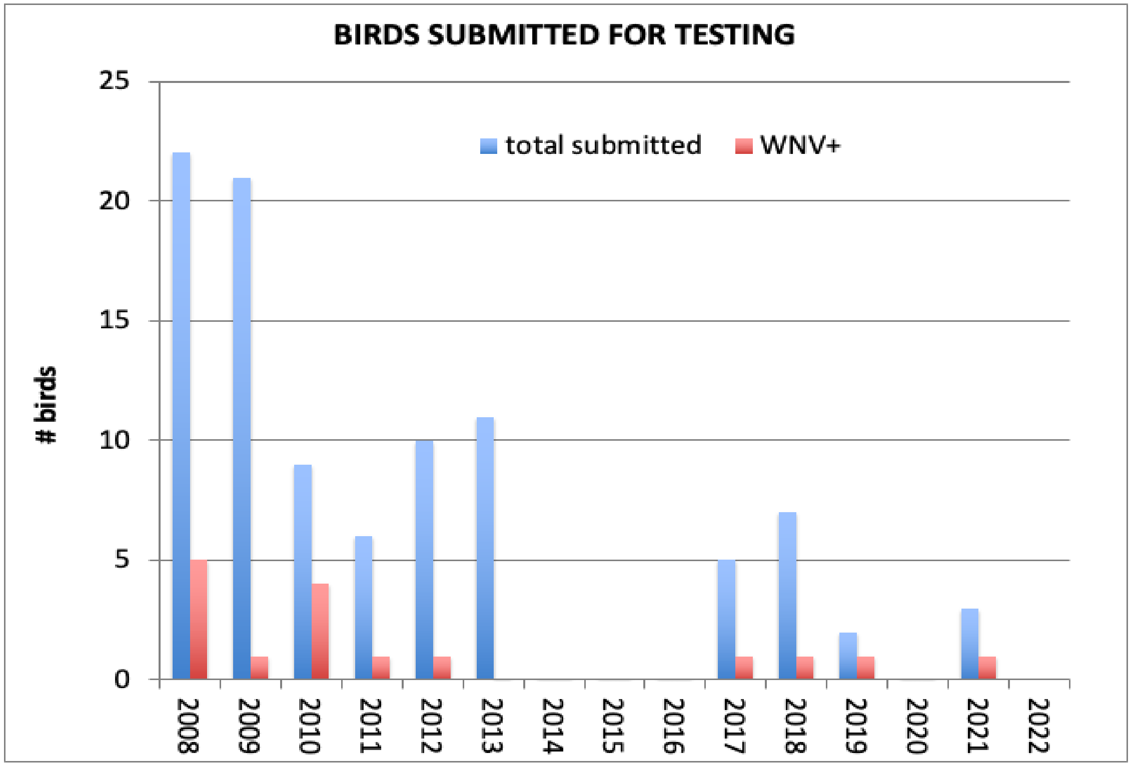


Onset Date	County	District	Virus	vaccination status	outcome
9/17/22	Randolph	7-0	WNV	unvaccinated	recovered
9/11/22	Richmond	6-0	WNV	unknown	unknown
11/30/22	Elbert	10-0	WNV	unvaccinated	unknown





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			

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 2022, 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.

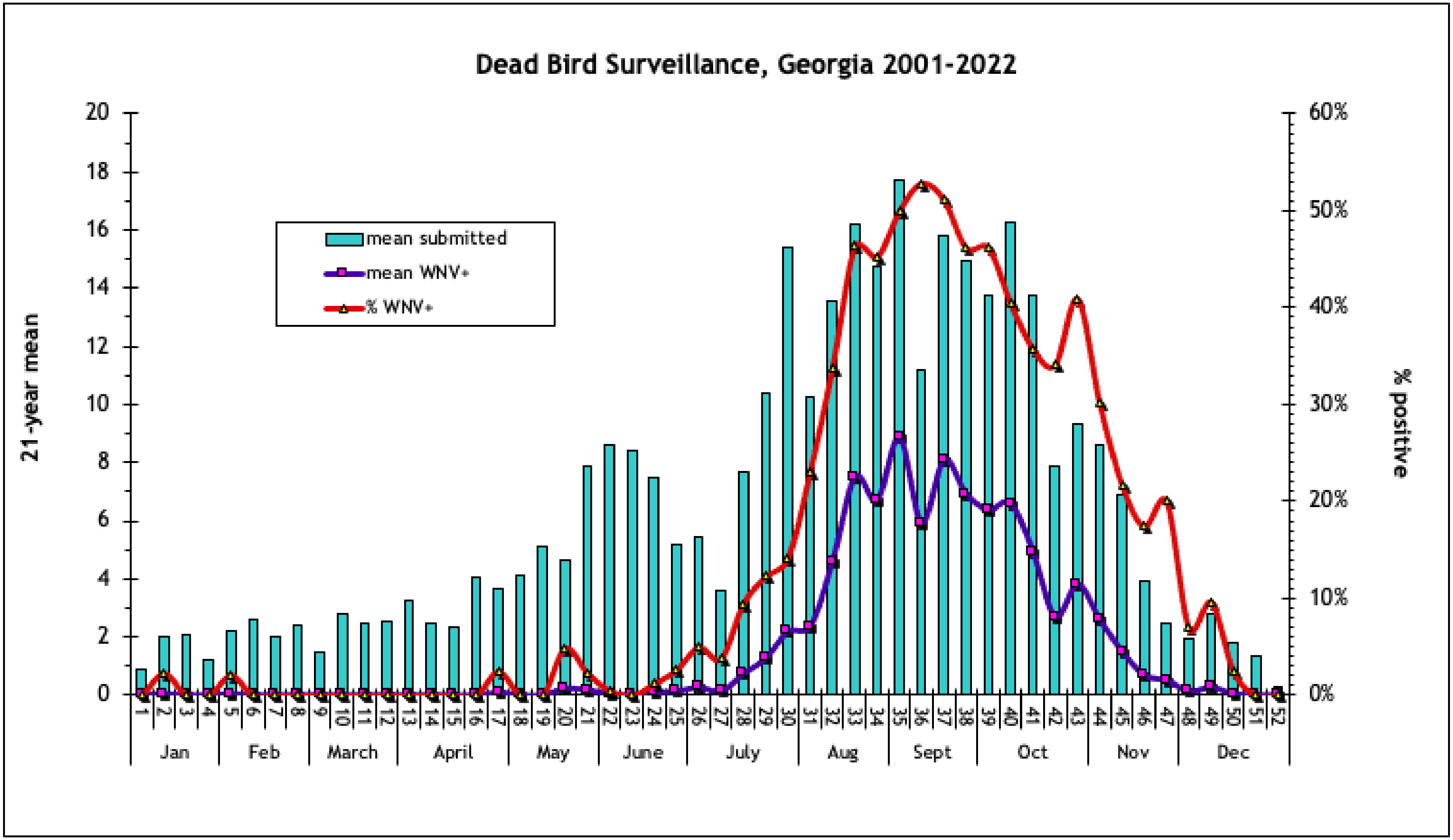
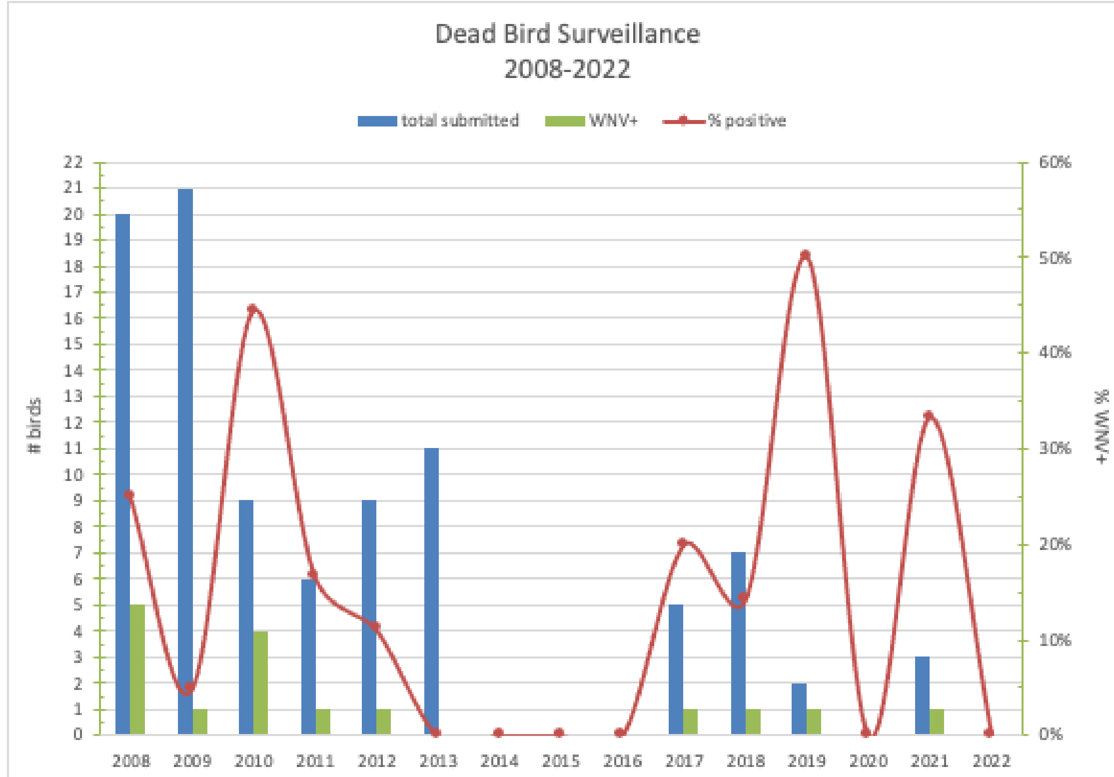
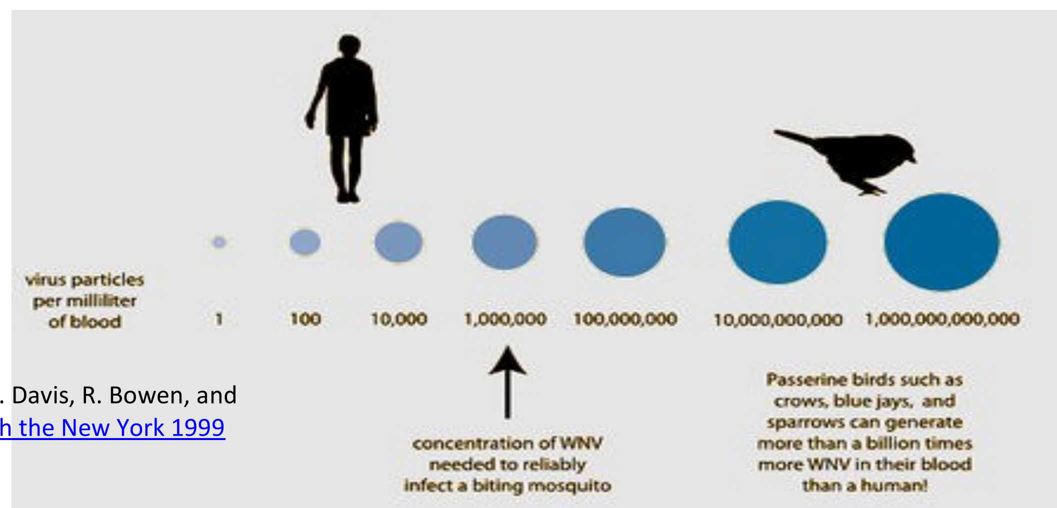

Dead Bird Surveillance, Georgia 2001-2022
mean submitted
mean WNV+
% WNV+
21-year mean
% positive
0
2
4
6
8
10
12
14
16
18
20
0%
10%
20%
30%
40%
50%
60%
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52
Jan
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.

Fourteen counties sent mosquitoes for testing in 2022. A total of 3611 pools of mosquitoes (82257 individuals) were sent for testing in 2022, with results reported to the GDPH. One species, *Culex quinquefasciatus* (96 pools) was 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. Two pools tested positive for EEE.

2022 WNV+ pools

County	# mosquitoes submitted	# WNV+ pools	MIR
Brooks	50		
Camden	6177		
Chatham	34298	45	1.31
Cook	50		
DeKalb	6450	29	4.50
Echols	50		
Fulton	6288	21	3.34
Glynn	14875		
Irwin	50		
Lanier	50		
Liberty	276		
Lowndes	13604	4	0.29
Tift	20	1	50.00
Turner	19		
TOTAL	**82257**	**100**	

Tested Mosquitoes (sum)

Species	3-2	3-5	8-1	9-1
Ae. albopictus		38		
Ae. vexans				1
An. crucians				3
Cq. perturbans			2727	192
Cs. melanura			1482	51
Culex spp.				1537
Cx. coronator			56	
Cx. erraticus				992
Cx. nigripalpus			4337	2475
Cx. quinquefasciatus	6288	6412	4108	50305
Cx. restuans			1032	55
Ma. titillans			148	
Oc. triseriatus			3	15

WNV+ mosquito pools

Month	Chatham	DeKalb	Fulton	Lowndes	Tift
June		1		4	1
July	31	13	7		
August	11	15	12		
September	2		2		
October	1				
Grand Total	**45**	**29**	**21**	**4**	**1**

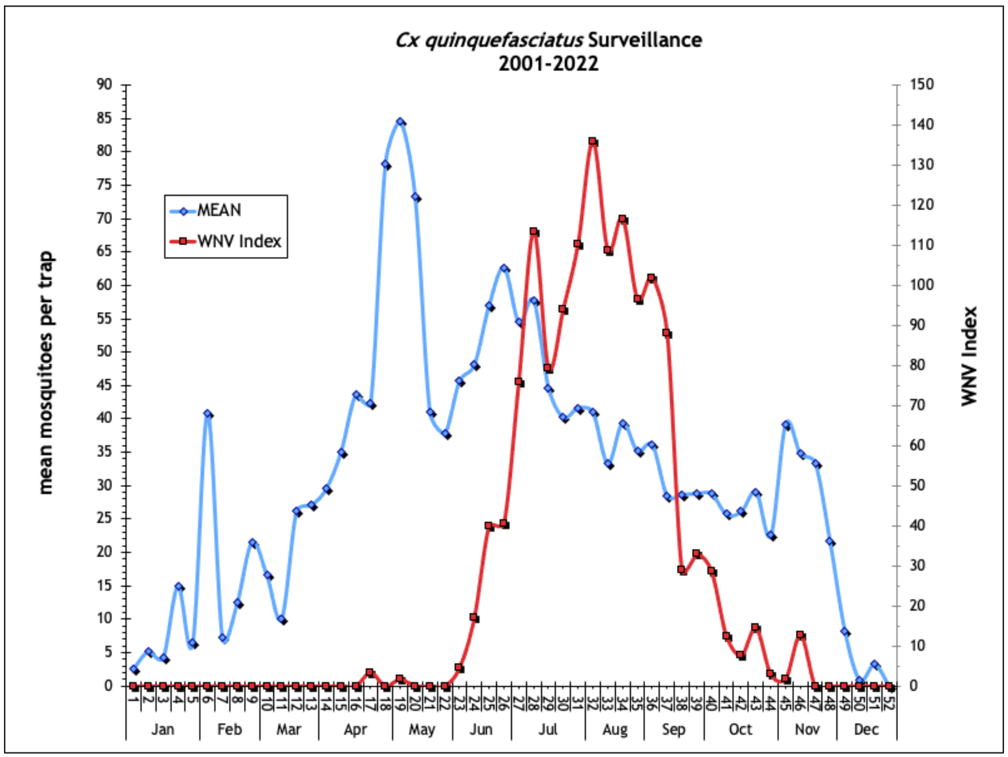
EEE+ mosquito pools

Species	Lowndes	Grand Total
Cq. perturbans	1	**1**
Cs. melanura	1	**1**
Grand Total	**2**	**2**

In 2022, the first WNV+ mosquitoes were detected in DeKalb County in late June. The last WNV+ pool was collected in Chatham in early October. Peaks in numbers of WNV+ pools occurred in July and August. Two WNV+ pools were collected from a CDC light trap. The rest (98) 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.

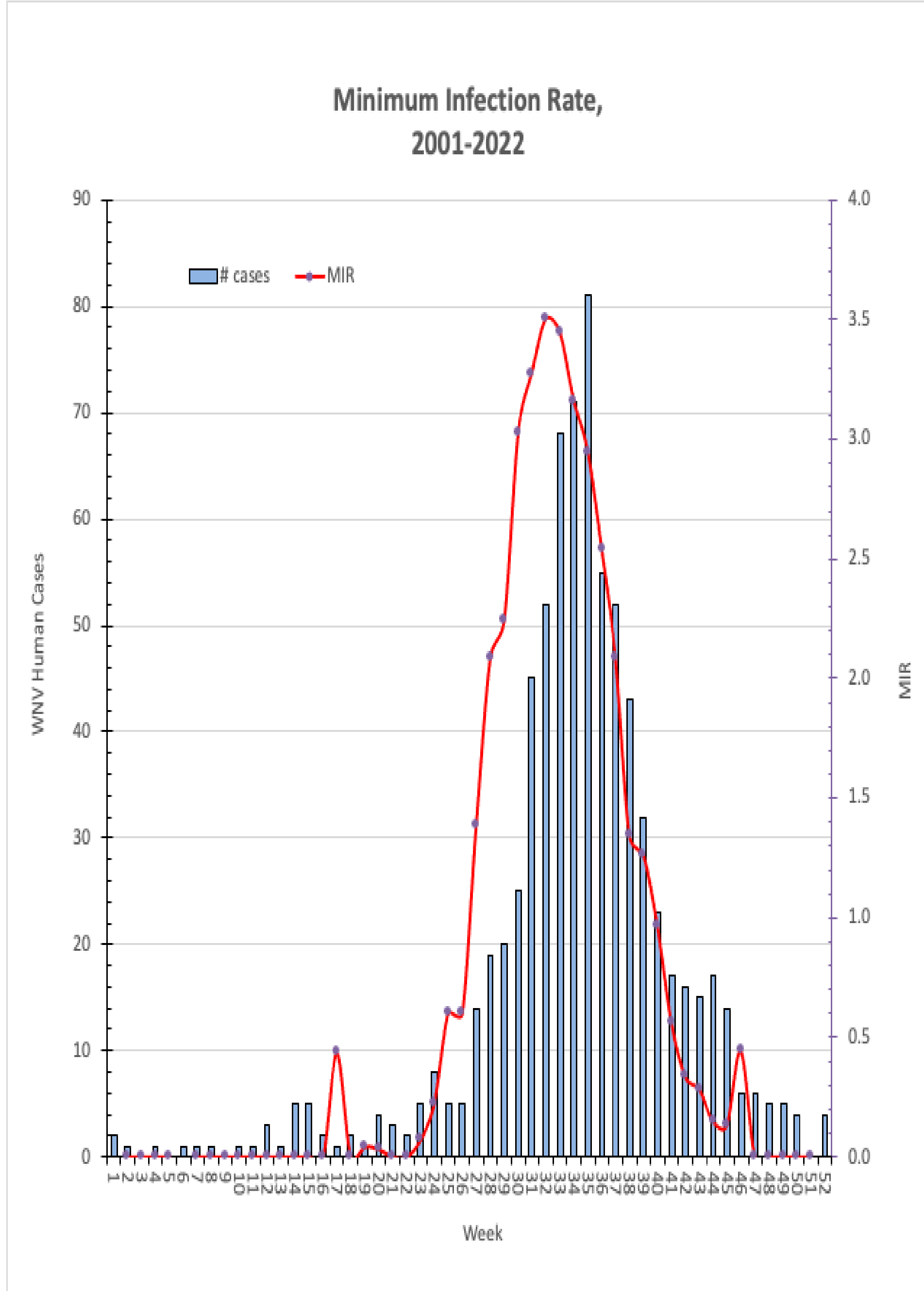
The Minimum Infection Rate or MIR = (# WNV+ Pools/Total # Mosquitoes Tested) X 1000. The WNV Index is the MIR multiplied by the number of mosquitoes per trap night. An MIR of 0 suggests that there is no viral activity in the area. An MIR of 0.1 to 3.9 indicates that some viral activity is present, and 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 2022 ranged from 0.13 to 2.96, with an average of 1.22.

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	50.70	100	23

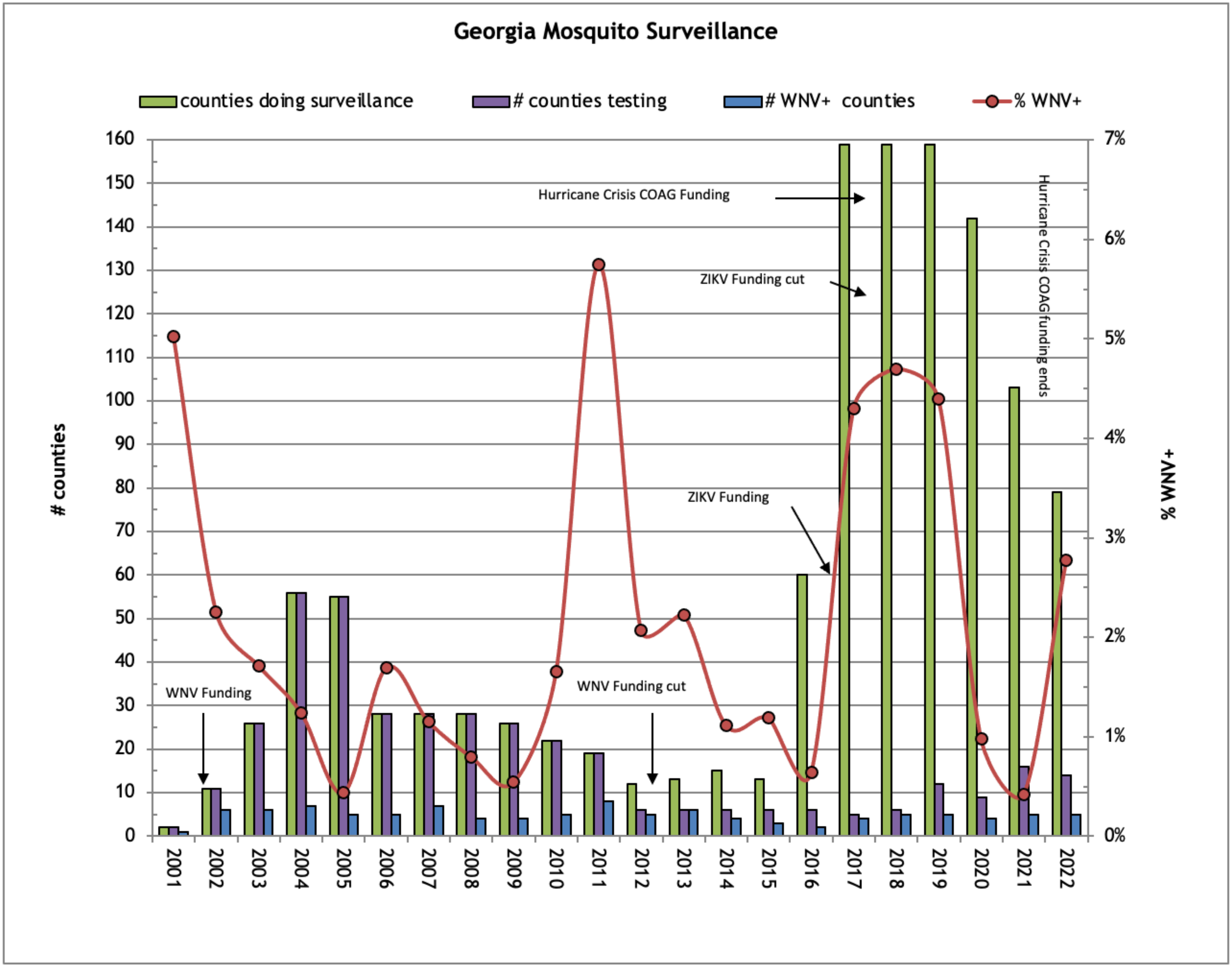
2001-2021	human cases	WNV+ mosquito pool	veterinary case	positive bird
total	615	2695	352	1904
mean/year	28.0	122.5	16.0	86.5

year	total pools	WNV+	% WNV+	human cases
2001	597	31	5.2%	6
2002	4032	57	1.4%	37
2003	6177	105	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	50	0.8%	12
2009	4446	24	0.5%	6
2010	5990	99	1.7%	14
2011	7622	397	5.2%	26
2012	6042	125	2.1%	117
2013	7453	150	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
MEAN	6137.5	115.4	2.1%	28.0
TOTAL	135024	2538	45.6%	617



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

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. 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.


Georgia Mosquito Surveillance
counties doing surveillance
counties testing
WNV+ counties
% WNV+
# counties
% WNV+
160
150
140
130
120
110
100
90
80
70
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50
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7%
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5%
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2021
2022
Hurricane Crisis COAG Funding
ZIKV Funding cut
ZIKV Funding
WNV Funding
WNV Funding cut
Hurricane Crisis COAG funding ends

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, and to the continuing COVID-19 response, surveillance was only done in 74 counties in 2022.

Month	# mosquitoes
January	295
February	607
March	2362
April	1733
May	3086
June	4933
July	2748
August	4797
September	5150
October	2385
November	2679
December	1317
Grand Total	32092

Month	# trap nights
January	69
February	57
March	193
April	181
May	229
June	395
July	395
August	509
September	479
October	288
November	131
December	84
Grand Total	3010

Month	# mosquitoes/trap night
January	4.28
February	10.65
March	12.24
April	9.57
May	13.48
June	12.49
July	6.96
August	9.42
September	10.75
October	8.28
November	20.45
December	15.68
Mean	11.19

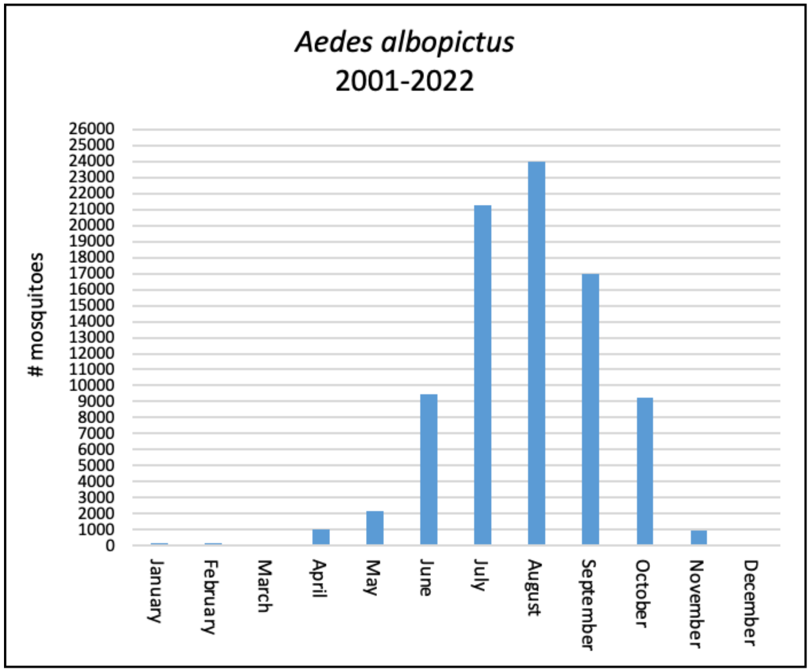
Untested Mosquitoes

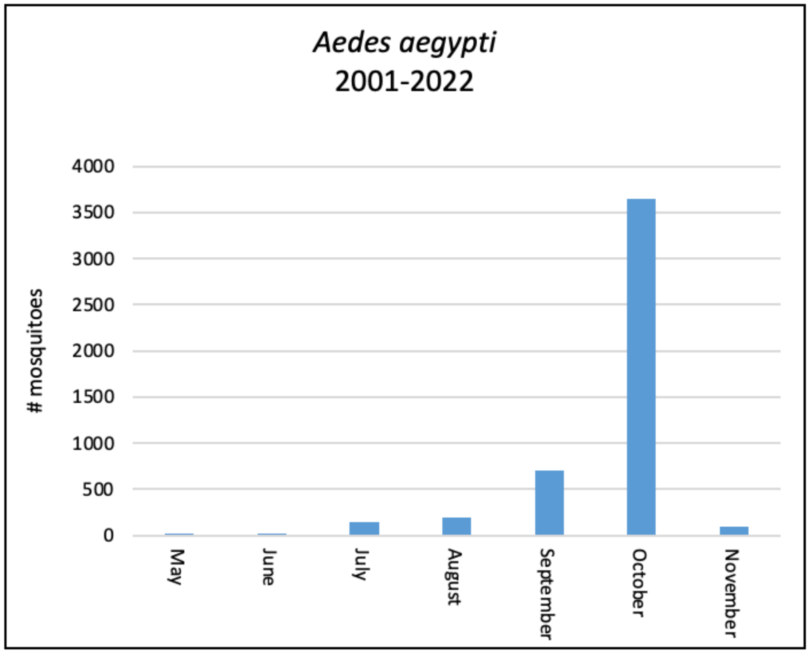
Species	# mosquitoes
Ae. aegypti	12
Ae. albopictus	5089
Ae. cinereus	19
Ae. dupreei	3
Ae. vexans	785
An. barberi	5
An. crucians	344
An. punctipennis	685
An. quadrimaculatus	123
Cq. perturbans	234
Cs. inornata	8
Cs. melanura	24
Cx. coronator	425
Cx. erraticus	631
Cx. nigripalpus	653
Cx. peccator	5
Cx. pilosus	8
Cx. quinquefasciatus	16531
Cx. restuans	583
Cx. salinarius	620
Cx. territans	66

Species	# mosquitoes
Oc. atlanticus	462
Oc. atropalpus	6
Oc. canadensis	49
Oc. dupreei	16
Oc. fulvus pallens	17
Oc. infirmatus	190
Oc. japonicus	271
Oc. mitchellae	10
Oc. sollicitans	9
Oc. sticticus	41
Oc. taeniorhynchus	858
Oc. triseriatus	32
Oc. trivittatus	5
Or. alba	3
Or. signifera	4
Ps. ciliata	324
Ps. columbiae	280
Ps. cyanescens	270
Ps. ferox	209
Ps. horrida	3
Ps. howardii	31
Ps. mathesoni	1
Tx. rutilus	3
Ur. lowii	5
Ur. sapphirina	35

Tested Mosquitoes

Species	# mosquitoes
Ae. albopictus	38
Ae. vexans	1
An. crucians	3
Cq. perturbans	2919
Cs. melanura	1533
Culex spp.	1537
Cx. coronator	56
Cx. erraticus	992
Cx. nigripalpus	6812
Cx. quinquefasciatus	67113
Cx. restuans	1087
Ma. titillans	148
Oc. triseriatus	18

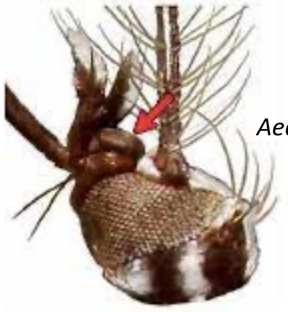




Aedes albopictus

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


Aedes aegypti


Aedes albopictus


Aedes aegypti

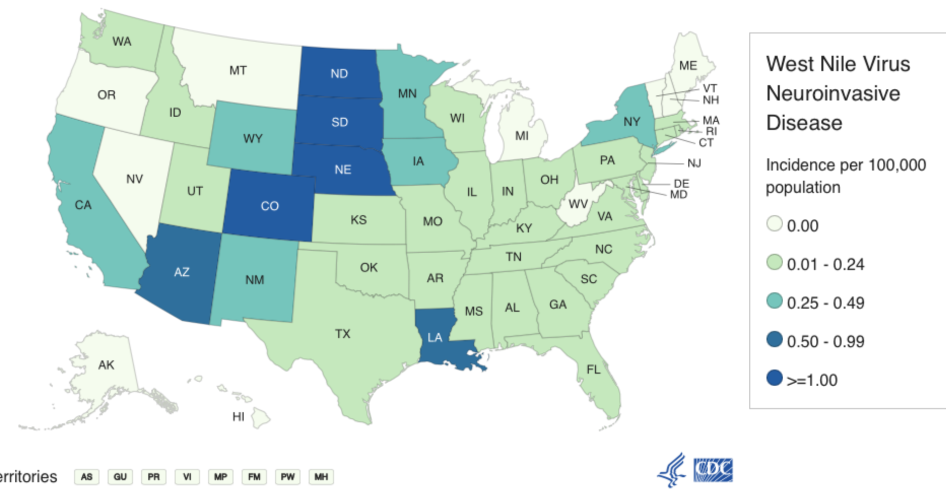

Aedes albopictus

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

WNV Activity Map

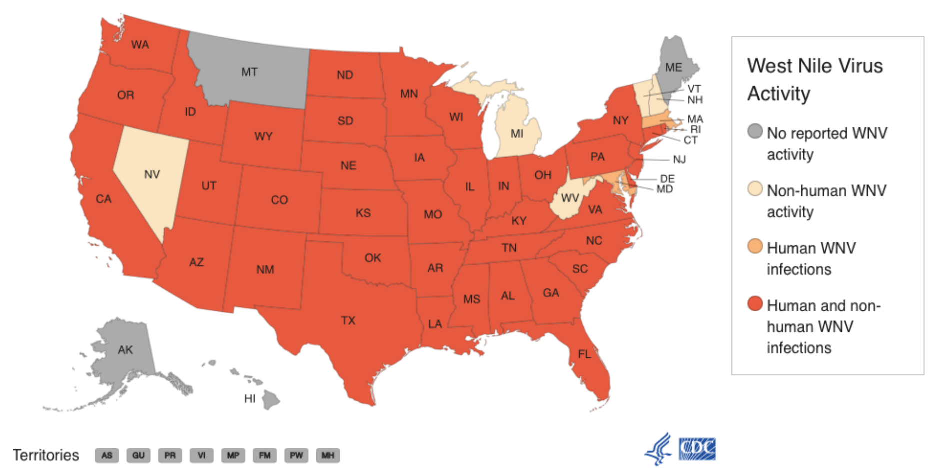
This map shows the incidence of human West Nile virus neuroinvasive disease (e.g., meningitis, encephalitis, or acute flaccid paralysis) by state for 2021 with shading ranging from 0.01-0.24, 0.25-0.49, 0.50-0.99, and greater than 1.00 per 100,000 population.



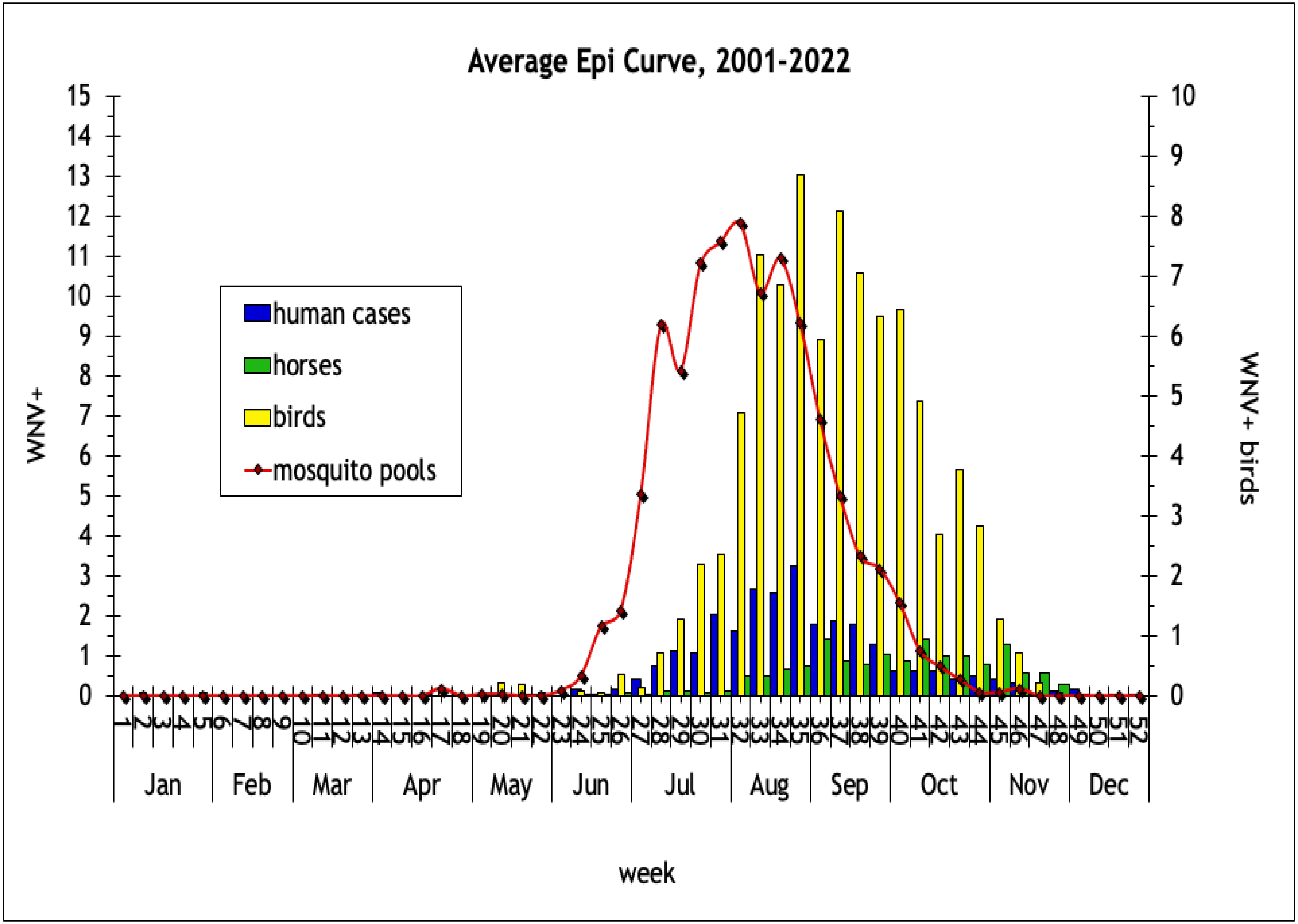
West Nile Virus Neuroinvasive Disease Incidence by State – United States, 2022 (as of January 10, 2023)

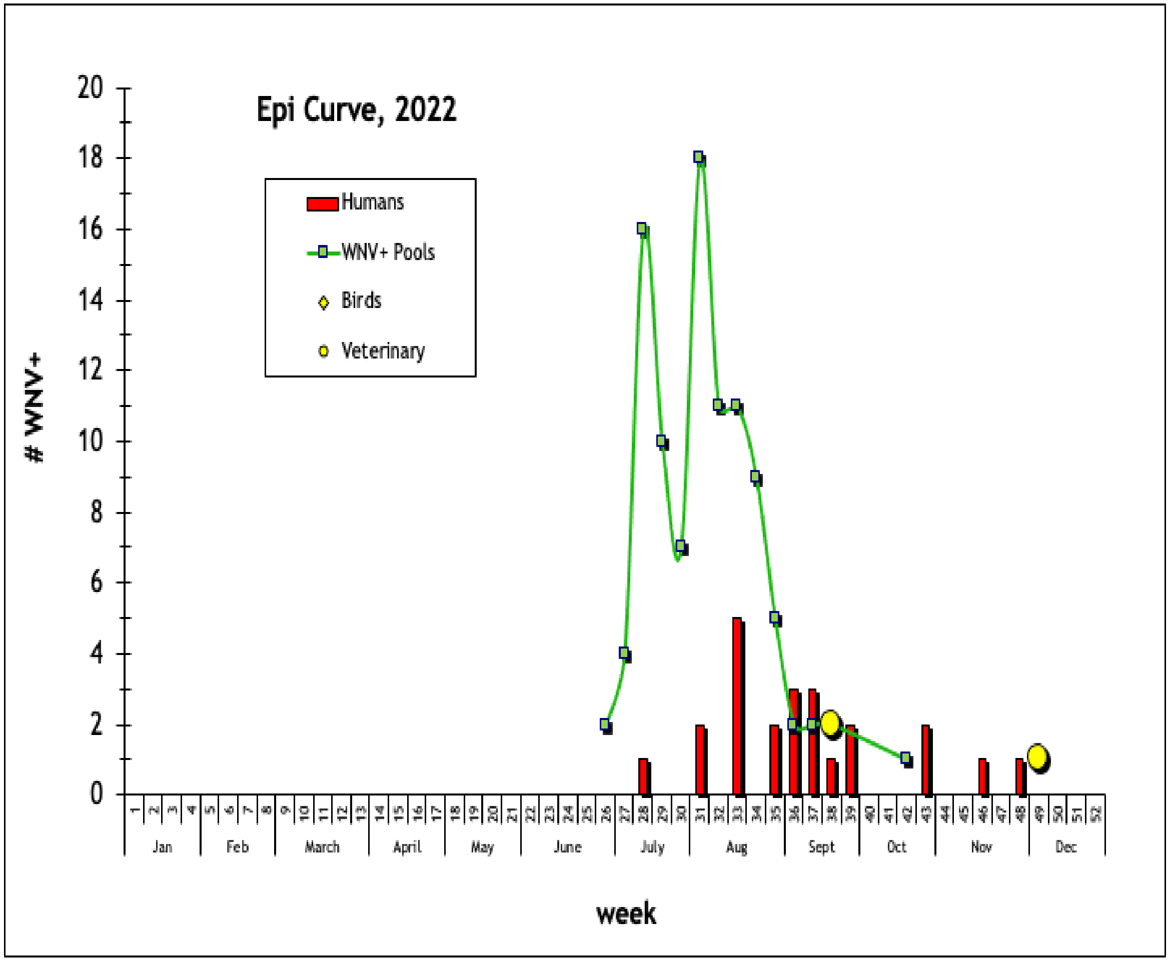
*WNV human disease cases or presumptive viremic blood donors. Presumptive viremic blood donors have a positive screening test which has not necessarily been confirmed.

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



West Nile Virus Activity by State – United States, 2022 (as of January 10, 2023)


Average Epi Curve, 2001-2022
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.

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- Shawna Stuck (Epidemiologist)
- Julie Gabel, DVM

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/.