

2012 END-OF-YEAR SUMMARY

2012 - ARBOVIRUS FINAL REPORT

Summary of Human West Nile Virus and Other Arboviral Infections, Georgia 2012

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.

For historical data on arboviral diseases in Georgia since 2001, see the end-of-year summaries posted at <http://health.state.ga.us/epi/vbd/past surv.asp>.

In 2012, Georgia reported 100 cases of WNV, with 6 deaths. Seventeen positive viremic blood donors were also identified, but are not counted as any of the 100 cases. Three cases were lost to follow-up. Forty-seven (47%) of the 100 cases experienced WNV neurologic illness (altered mental status, encephalitis, and/or meningitis) and 50 (50%) were diagnosed with WNV fever. The viremic blood donors remained asymptomatic. Table 1 shows the clinical syndrome for each case.

The average age of cases was 55 years (range 11-87). The average age of those with WNV neurologic illness was 59 years (range 11-87)(Table 3). Sixty-six (66%) of the 100 cases were male. The majority of cases were reported in August and September, although there was a peak in number of cases in July. Table 2 shows the counties of residence of each case.

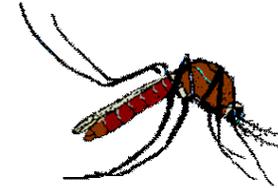
Table 2: Cases by County

WNV Cases by County (includes asymptomatic cases*)			
County	Count	County	Count
Bartow	1	Glynn	3
Bibb	1	Gwinnett	6
Brantley	1	Habersham	1
Bryan	2	Houston	5
Bulloch	1	Lee	2
Candler	1	Long	1
Carroll	1	Macon	1
Catoosa	1	Miller	1
Chatham	1	Mitchell	1
Cherokee	2	Muscogee	9
Clayton	3	Peach	3
Cobb	9	Randolph	1
Columbia	4	Richmond	4
Dawson	1	Schley	1
Decatur	1	Sumter	2
DeKalb	9	Terrell	1
Dougherty	12	Thomas	2
Douglas	2	Toombs	1
Early	1	Troup	1
Fayette	1	Walton	1
Floyd	1	Wayne	1
Forsyth	2	Worth	1
Fulton	10		

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Table 1: Clinical Syndromes, 2012

Arbovirus	Month of Onset	County of Origin	Clinical Syndrome	Fatality
DENGUE	Jan-12	Unknown	UNKNOWN	UNKNOWN
	Jun-12	Jamaica	FEVER	NO
		Jamaica	FEVER	NO
		Philippines	FEVER	NO
	Jul-12	Guatamala	FEVER	NO
	Aug-12	St Thomas, US Virgin Islands	FEVER	NO
		Costa Rica	FEVER	NO
		Dominican Republic	FEVER	NO
		St George's Island, Florida	FEVER	NO
	Sep-12	Suriname	FEVER	NO
	Nov-12	India	FEVER	NO
		Jamaica	FEVER	NO
		Unknown	UNKNOWN	NO



In addition to WNV, one case of Eastern Equine Encephalitis was reported from Thomas County in 2012.

Thirteen internationally acquired cases of Dengue were also reported.

If you have questions or comments, please contact Melissa Ivey, MPH, Human Arboviral Infections Surveillance Coordinator at the Georgia Department of Public Health, at 404-657-6442 or mlhall1@dhr.state.ga.us.

Table 1: Clinical Syndromes, 2012

Arbovirus	Month of Onset	County of Residence	Clinical Syndrome	Fatality
EEE	Sep-12	Thomas	ENCEPHALITIS	NO

1



(Eggs)



(Larva)



(Pupa)



(Adult)

Table 3: Age Ranges, WNV 2012

age range	WNND	WNF	other	asymptomatic
0-10				
11-20	1	2	1	1
21-30	1	3	1	4
31-40	4	5		4
41-50	9	5		3
51-60	10	9		2
61-70	8	18		3
71-80	11	5	1	
>80	3	3		
TOTAL	47	50	3	17

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Table 1: Clinical Syndromes, WNV 2012

Month of Onset	County of Residence	Clinical Syndrome	Fatality	Month of Onset	County of Residence	Clinical Syndrome	Fatality
May-12	Cobb	ENCEPHALITIS	NO	Aug-12	Bartow	MENINGITIS	NO
Jun-12	Cobb	MENINGITIS	NO		Bibb	ASYMPTOMATIC	NO
	Muscogee	ASYMPTOMATIC	NO		Bryan	MENINGITIS	NO
Jul-12	Brantley	FEVER	NO		Cherokee	ASYMPTOMATIC	NO
	Bulloch	GUILLIAN_BARRE_SYNDROME	NO		Clayton	UNKNOWN	NO
	Candler	ASYMPTOMATIC	NO		Clayton	ENCEPHALITIS	UNKNOWN
	Catoosa	MENINGOENCEPHALITIS	YES		Cobb	FEVER	NO
	Cobb	FEVER	NO		Cobb	FEVER	NO
	Cobb	MENINGITIS	NO		Cobb	FEVER	NO
	DeKalb	ASYMPTOMATIC	NO		Columbia	FEVER	NO
	DeKalb	FEVER	NO		Columbia	FEVER	NO
	Dougherty	MENINGITIS	NO		Columbia	FEVER	NO
	Dougherty	MENINGITIS	NO		DeKalb	MENINGITIS	NO
	Dougherty	MENINGITIS	NO		DeKalb	FEVER	NO
	Dougherty	MENINGOENCEPHALITIS	NO		DeKalb	FEVER	NO
	Dougherty	FEVER	NO		DeKalb	FEVER	NO
	Forsyth	FEVER	NO		DeKalb	MENINGITIS	NO
	Fulton	MENINGITIS	NO		Dougherty	ENCEPHALITIS	YES
	Fulton	MENINGITIS	NO		Dougherty	ENCEPHALITIS	YES
	Lee	MENINGITIS	NO		Dougherty	GUILLIAN_BARRE_SYNDROME	NO
	Lee	MENINGITIS	NO		Douglas	FEVER	NO
	Macon	MENINGITIS	NO		Douglas	ENCEPHALITIS	UNKNOWN
	Mitchell	FEVER	NO		Early	ENCEPHALITIS	YES
	Muscogee	ENCEPHALITIS	NO		Fayette	ASYMPTOMATIC	NO
	Muscogee	FEVER	NO		Forsyth	ASYMPTOMATIC	NO
	Muscogee	MENINGITIS	NO		Fulton	FEVER	NO
	Randolph	ENCEPHALITIS	NO		Fulton	FEVER	NO
	Richmond	MENINGITIS	NO		Fulton	FEVER	NO
	Richmond	ASYMPTOMATIC	NO		Fulton	ENCEPHALITIS	NO
	Walton	FEVER	NO		Fulton	FEVER	NO
	Worth	MENINGITIS	NO		Glynn	ALTERED MENTAL STATUS	NO

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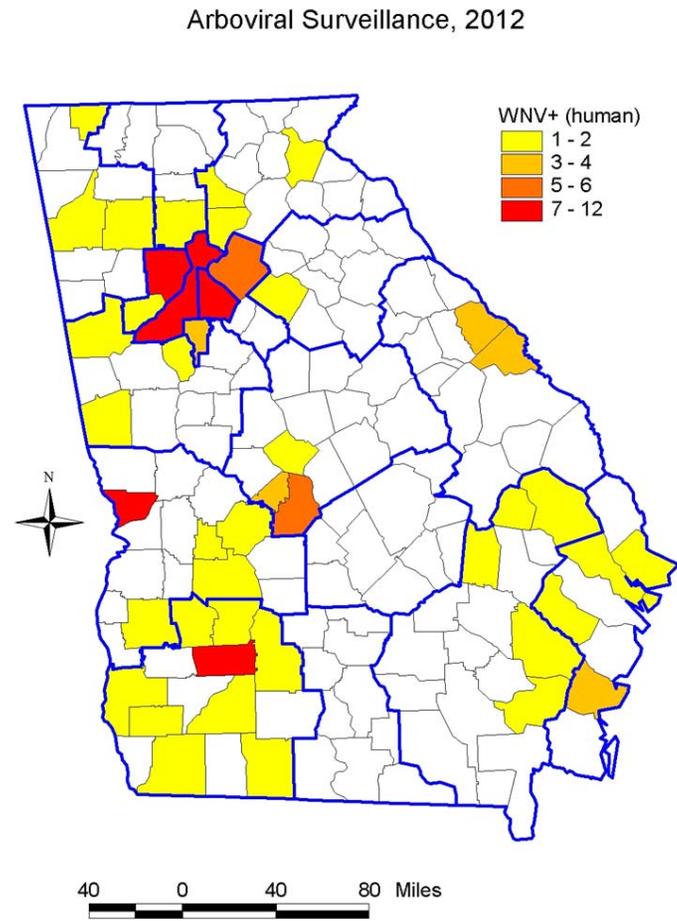
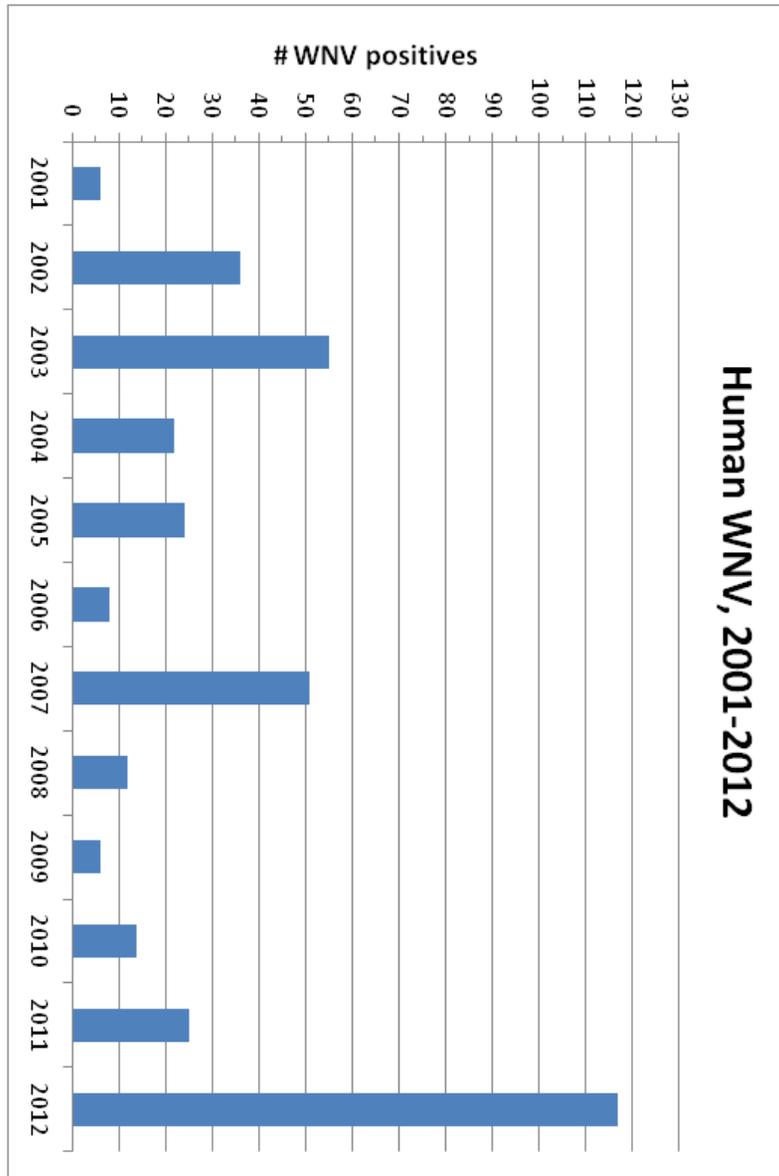
Table 1: Clinical Syndromes, WNV 2012

Month of Onset	County of Residence	Clinical Syndrome	Fatality	Month of Onset	County of Residence	Clinical Syndrome	Fatality
Aug-12	Gwinnett	FEVER	NO	Sep-12	Bryan	FEVER	NO
	Gwinnett	MENINGITIS	NO		Carroll	FEVER	NO
	Habersham	FEVER	NO		Cherokee	ASYMPTOMATIC	NO
	Houston	MENINGITIS	NO		Cobb	MENINGITIS	NO
	Houston	ENCEPHALITIS	YES		Cobb	MENINGITIS	NO
	Houston	FEVER	NO		Dawson	FEVER	NO
	Houston	FEVER	NO		Decatur	ASYMPTOMATIC	NO
	Houston	FEVER	NO		Dougherty	ASYMPTOMATIC	NO
	Miller	GUILLIAN_BARRE_SYNDROME	NO		Dougherty	FEVER	NO
	Muscogee	FEVER	NO		Dougherty	ENCEPHALITIS	NO
	Muscogee	FEVER	NO		Dougherty	FEVER	NO
	Muscogee	ENCEPHALITIS	NO		Fulton	ENCEPHALITIS	NO
	Muscogee	FEVER	NO		Fulton	FEVER	NO
	Muscogee	MENINGITIS	NO		Glynn	MENINGOENCEPHALITIS	NO
	Peach	UNKNOWN	NO		Gwinnett	FEVER	NO
	Richmond	MENINGITIS	NO		Gwinnett	MENINGITIS	YES
	Richmond	FEVER	NO		Gwinnett	ASYMPTOMATIC	NO
	Schley	FEVER	NO		Gwinnett	FEVER	NO
	Sumter	FEVER	NO		Peach	ASYMPTOMATIC	NO
	Terrell	FEVER	NO		Toombs	ENCEPHALITIS	NO
Troup	FEVER	NO	Oct-12	Chatham	ENCEPHALITIS	NO	
Wayne	FEVER	NO		DeKalb	FEVER	NO	
				Floyd	FEVER	NO	
				Glynn	FEVER	NO	
				Long	FEVER	NO	
				Sumter	UNKNOWN	UNKNOWN	
			Nov-12	Thomas	FEVER	NO	
				Clayton	ASYMPTOMATIC	NO	
				Columbia	FEVER	NO	
				DeKalb	ASYMPTOMATIC	NO	
				Fulton	ASYMPTOMATIC	NO	
			Peach	ASYMPTOMATIC	NO		
			Thomas	MENINGOENCEPHALITIS	NO		



Diagnosis	Virus	
	EEE	WNV
ALTERED MENTAL STATUS		1
ASYMPTOMATIC		17
ENCEPHALITIS	1	15
FEVER		50
GUILLIAN_BARRE_SYNDROME		3
MENINGITIS		24
MENINGOENCEPHALITIS		4
UNKNOWN		3

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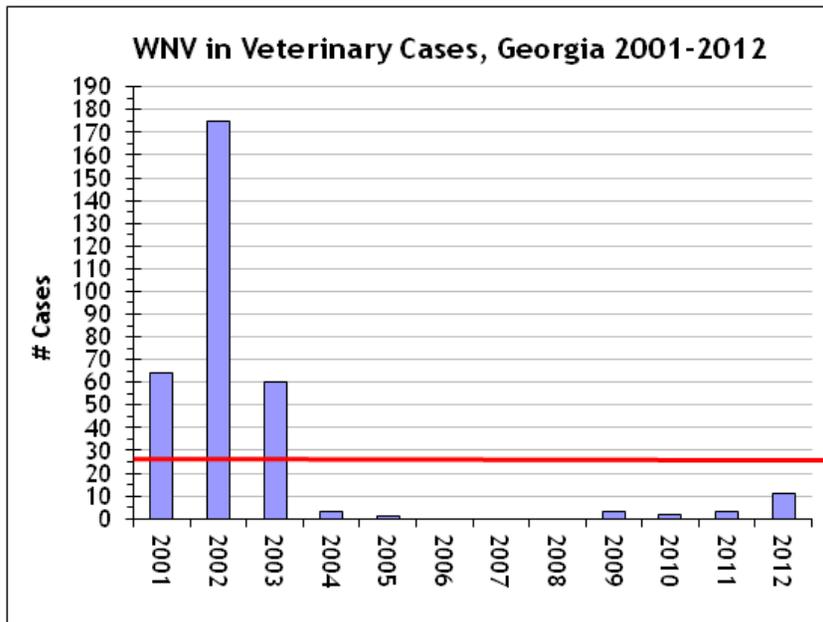


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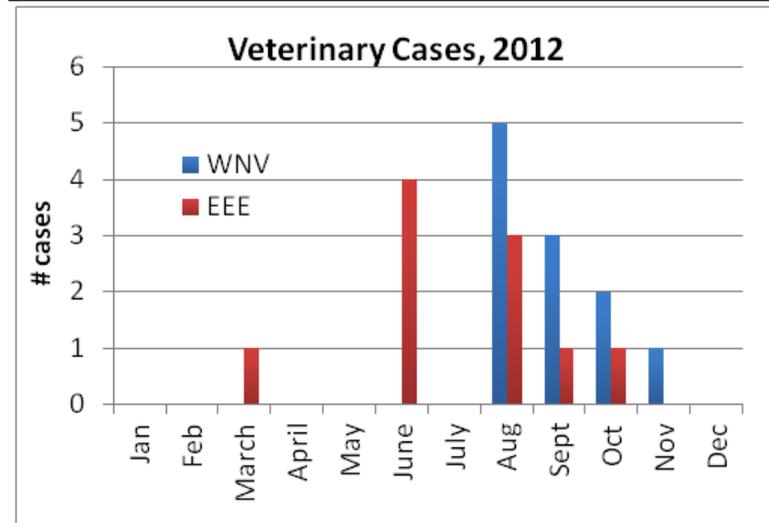
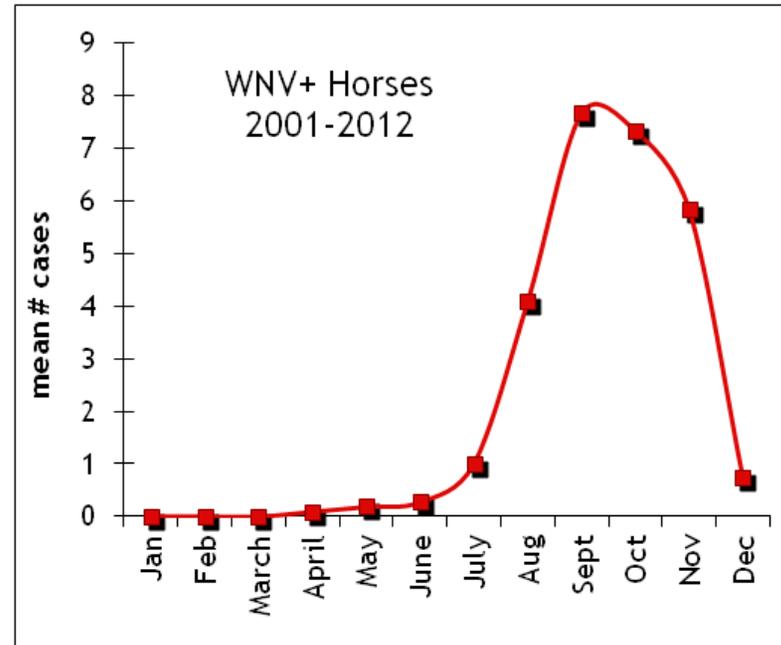
Veterinary Data

Eleven horse tested positive for WNV in 2012. 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 has lately begun to increase again.

Ten horses tested positive for EEE in 2012. 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 due primarily to under-testing, although sub-clinical infections can occur with EEE.



mean = 26.8



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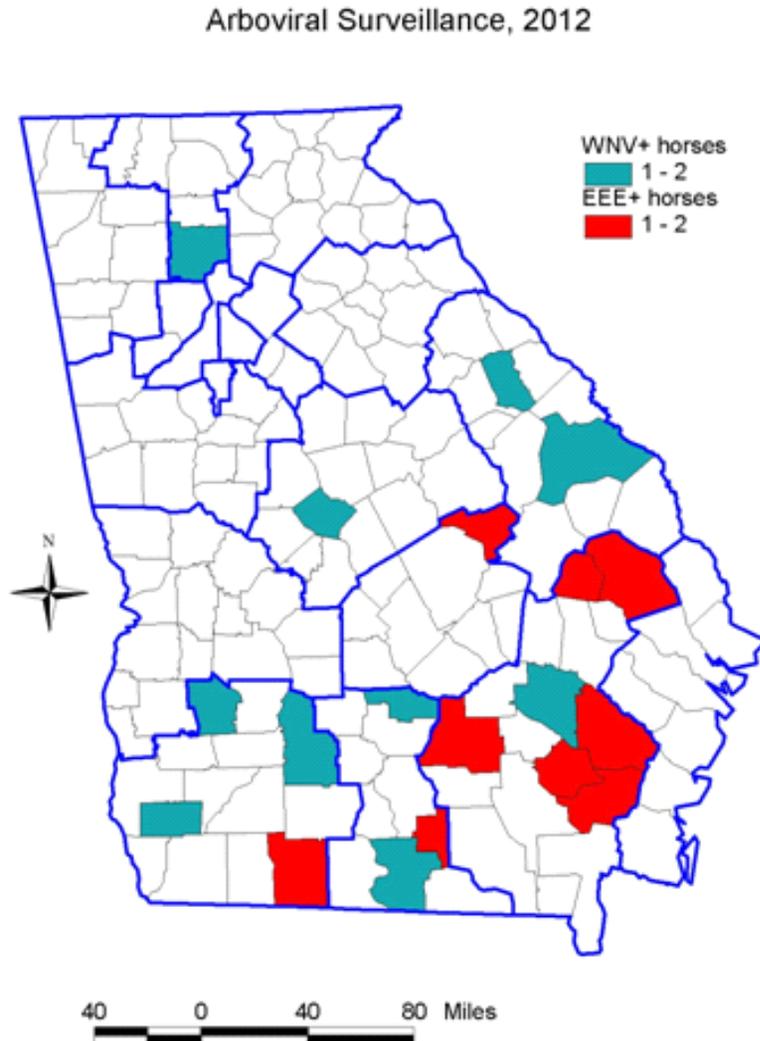
A horse with [West Nile virus](#) will display some of the following symptoms:

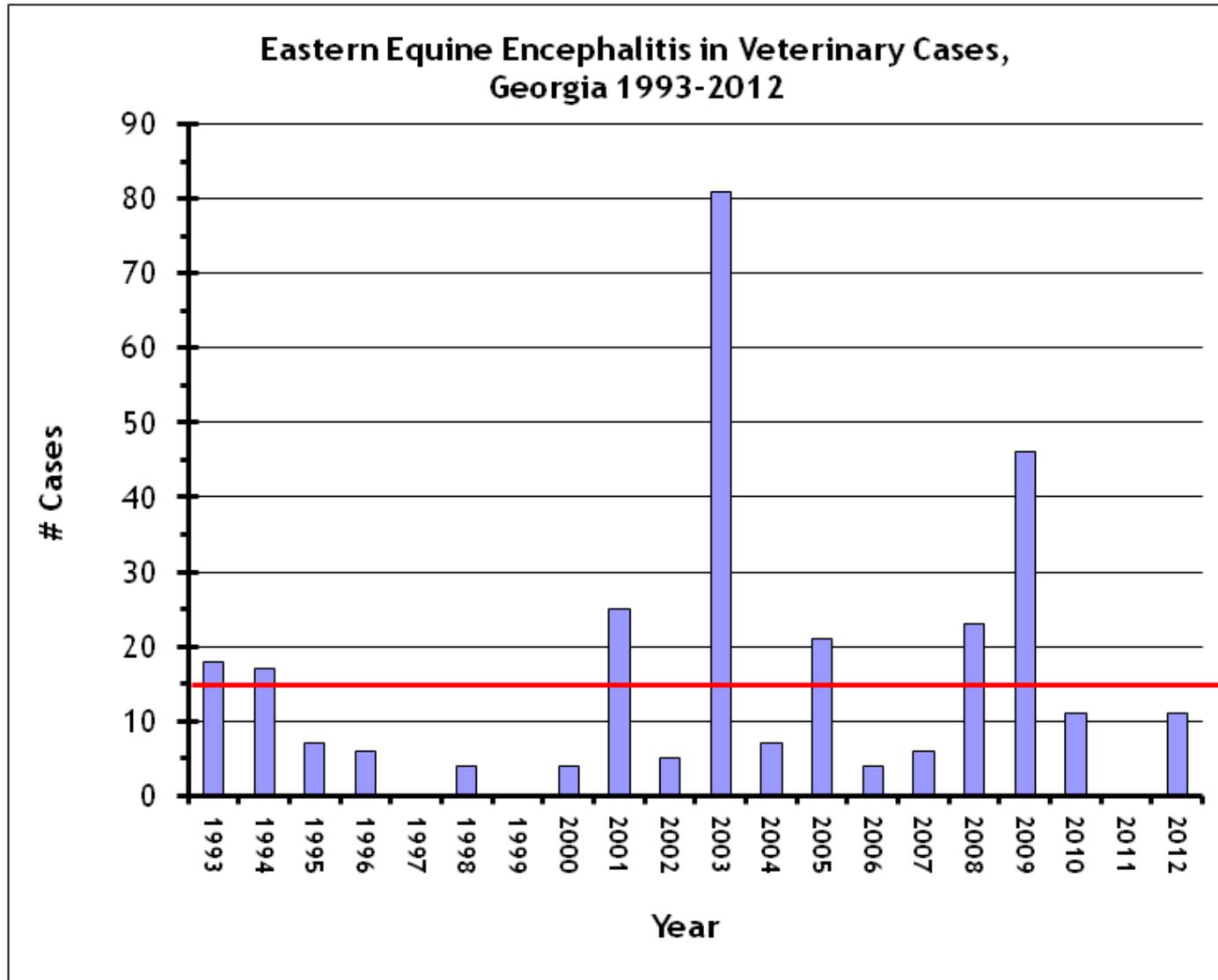
- General loss of appetite
- Hind limb weakness
- Fever
- Impaired vision
- Walking in circles
- Inability to swallow
- Coma

Mortality in horses with WNV are ~35%. However, sometimes a horse can be infected with West Nile virus and not show any symptoms.

Symptoms in horses with [Eastern Equine Encephalitis](#) occur one to three weeks after infection, and begins with a fever that may reach as high as 106 °F. The fever usually lasts for 24–48 hours.

Nervous signs appear during the fever that include sensitivity to sound, periods of excitement, and restlessness. Brain lesions appear, causing drowsiness, drooping ears, circling, aimless wandering, head pressing, inability to swallow, and abnormal gait. Paralysis follows, causing the horse to have difficulty raising its head. The horse usually suffers complete paralysis and death two to four days after symptoms appear. Mortality rates among horses with EEE range from 70 to 90%.





mean = 14.8

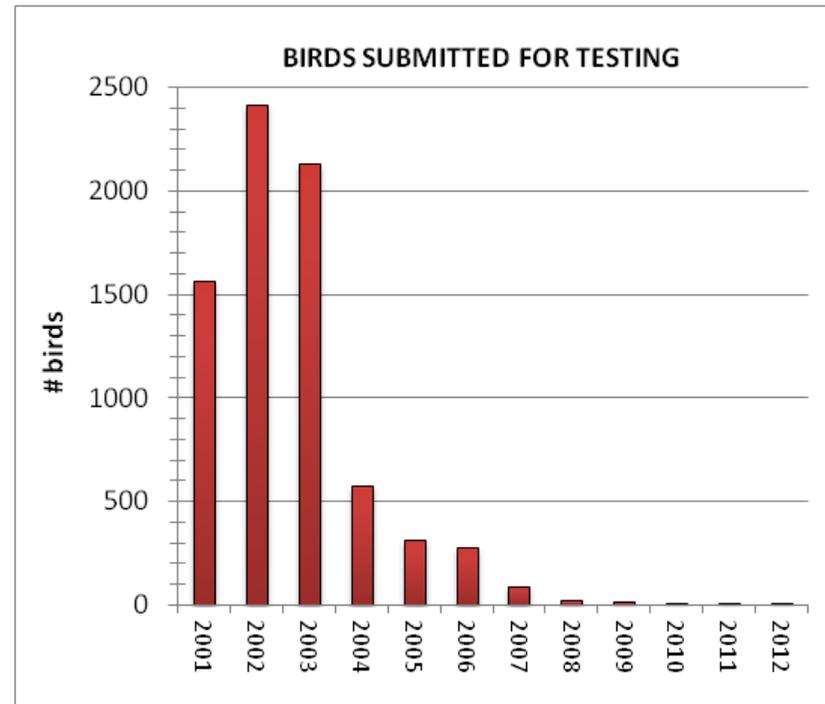
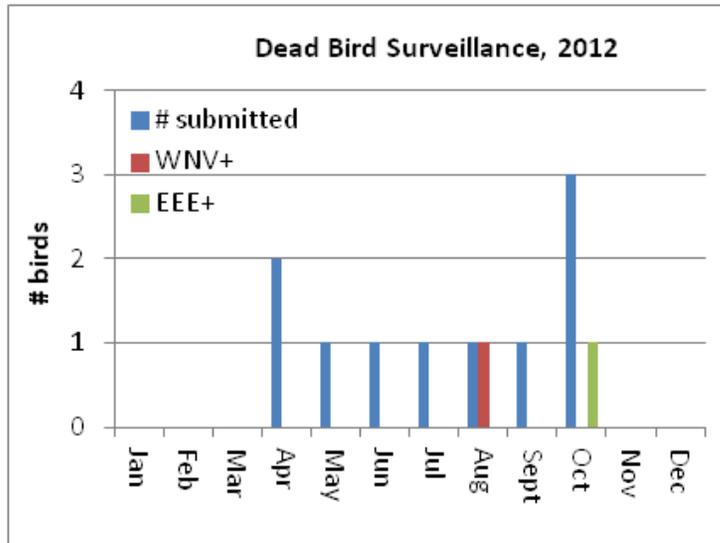
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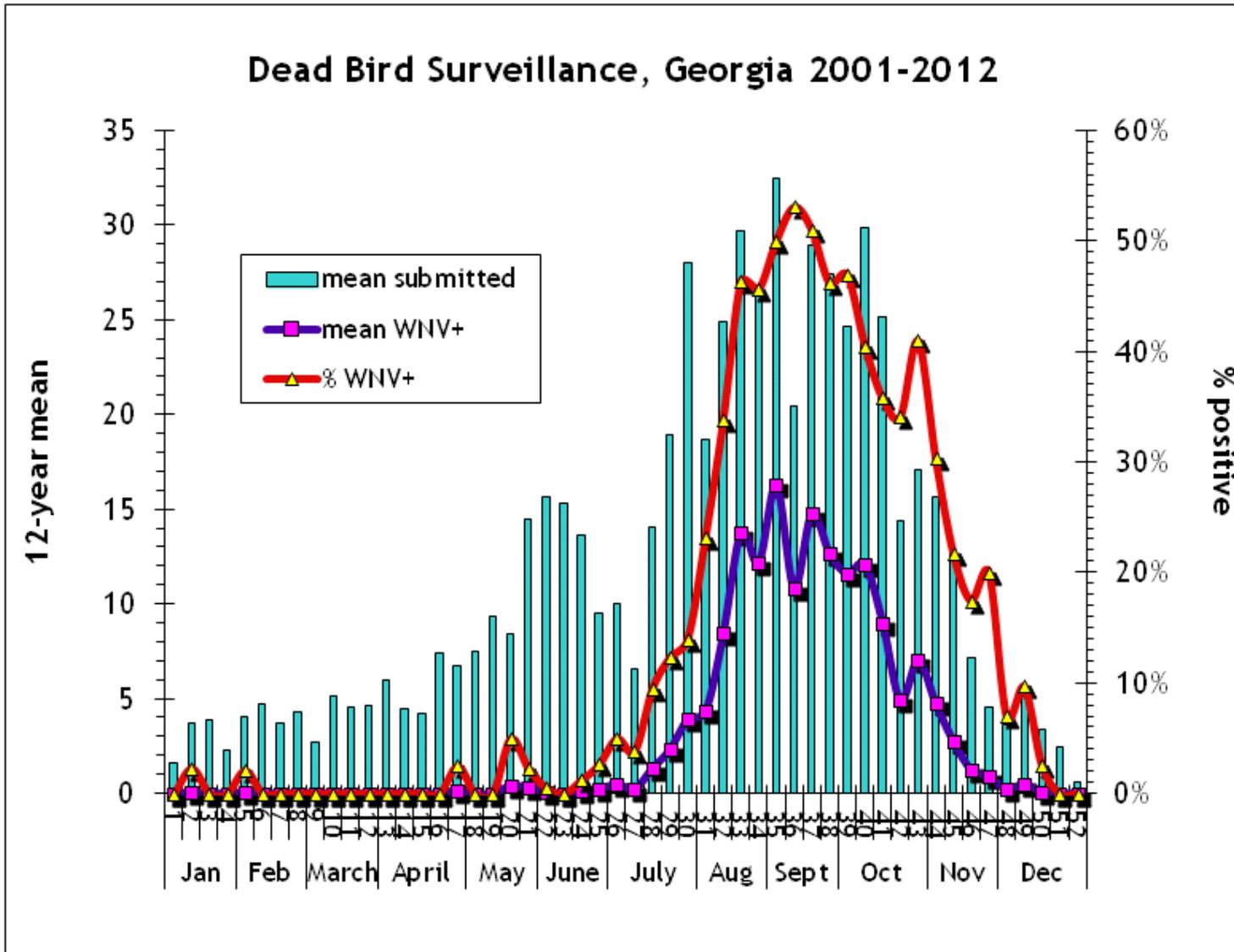
DEAD BIRD SURVEILLANCE

As of 2012, federal funding was no longer available to test birds. However, a total of 10 birds were submitted for testing in 2012 from counties with sufficient funding to maintain some level of arboviral surveillance and testing. The first birds were submitted for testing in April. WNV was detected in Aug in one bird from a flock of 11 birds of various species in an outdoor aviary after 4 birds from the flock died. In Oct, EEE was reported in an emu flock.

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, 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.

Species	County	NEG	WNV+	EEE+
Brown Lory	Mitchell		1	
Brown Thrasher	Chatham	1		
Common Grackle	Chatham	1		
Emu	Richmond			1
Mourning Dove	DeKalb	1		
Northern Cardinal	DeKalb/Chatham	2		
Ruby-throated Hummingbird	DeKalb	1		
Swainsons Thrush	DeKalb	2		
TOTAL		8	1	1





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Mosquito Surveillance***

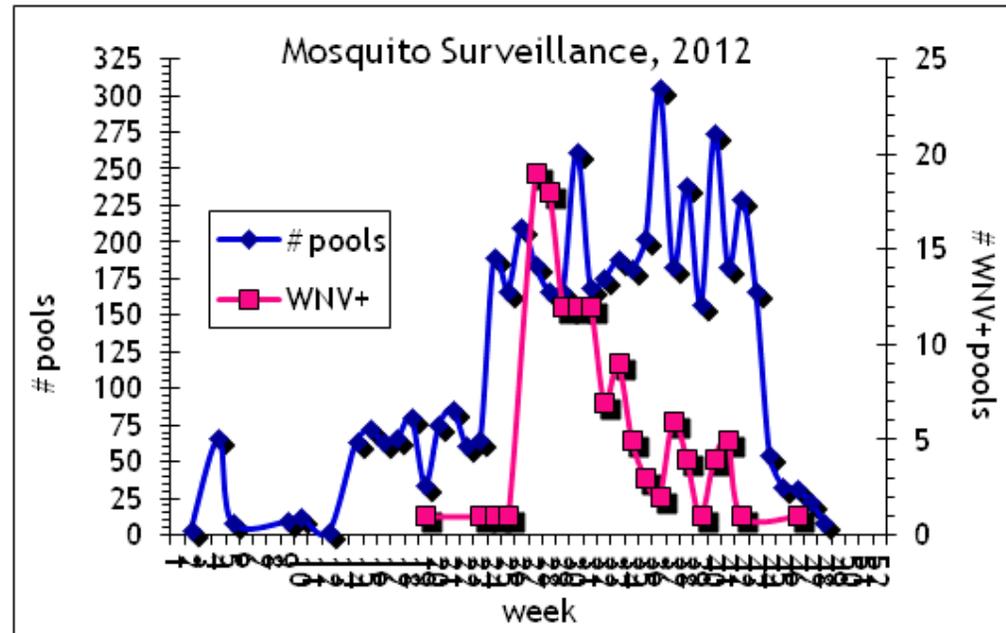
In 2012, due to funding cuts, mosquito testing was no longer supported by the State Department of Public Health. Counties holding independent contracts with SCWDS for testing continued doing mosquito surveillance and shared the test results with the GDPH; 6 counties and one city sent mosquitoes for testing in 2012.

A total of 6173 pools of mosquitoes (100150 individuals) were sent for testing. Mosquitoes found WNV+ (125 pools) were *Culex quinquefasciatus* and *Cx nigripalpus*, as well as unidentified *Culex spp*; the mosquito species most commonly found positive (81.6%) was *Cx quinquefasciatus*. In addition to WNV, 3 pools were found to be EEE+, 60 pools were Flanders+, and 2 pools were positive with a variant of the Flanders virus.

species	EEE+	Flanders+	Flanders (variant)+	WNV+
<i>Cs. melanura</i>	2			
<i>Culex spp.</i>		31		22
<i>Cx. erraticus</i>	1			
<i>Cx. nigripalpus</i>				1
<i>Cx. quinquefasciatus</i>		27	2	102
<i>Cx. restuans</i>		1		
<i>Cx. salinarius</i>		1		

county	# pools	WNV+
Chatham	3403	38
DeKalb	279	57
Fulton	7411	7
Glynn	320	5
Liberty (Hinesville)	105	
Lowndes	1818	18

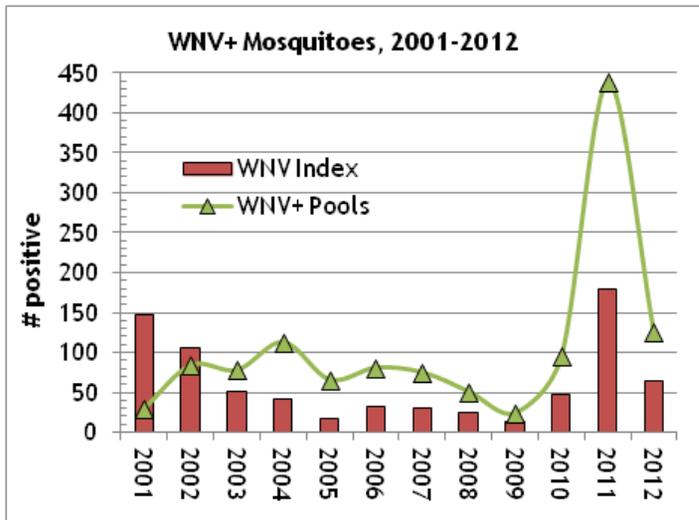
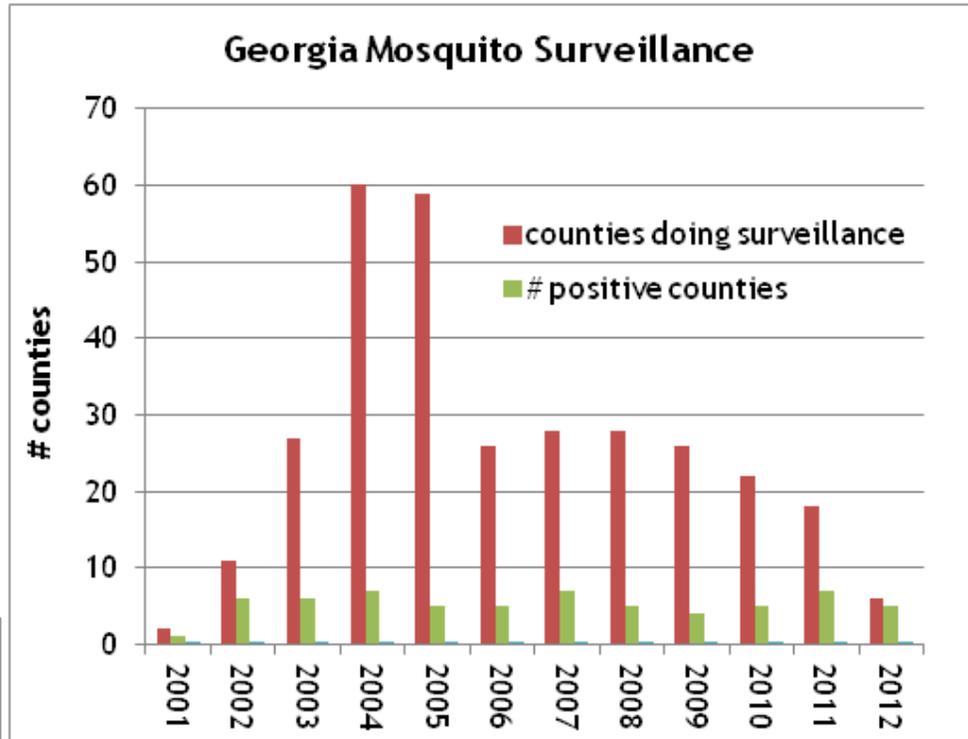
Species	# WNV+ pools	% positive
<i>Culex spp.</i>	22	17.6%
<i>Cx. quinquefasciatus</i>	102	81.6%
<i>Cx. nigripalpus</i>	1	0.8%



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The first WNV+ mosquitoes were detected in Lowndes County in early May. The last WNV+ pool was collected in Chatham County in mid-November. Peaks in numbers of WNV+ pools occurred in July. Most (99.2%) of the WNV+ mosquitoes were caught in gravid traps.

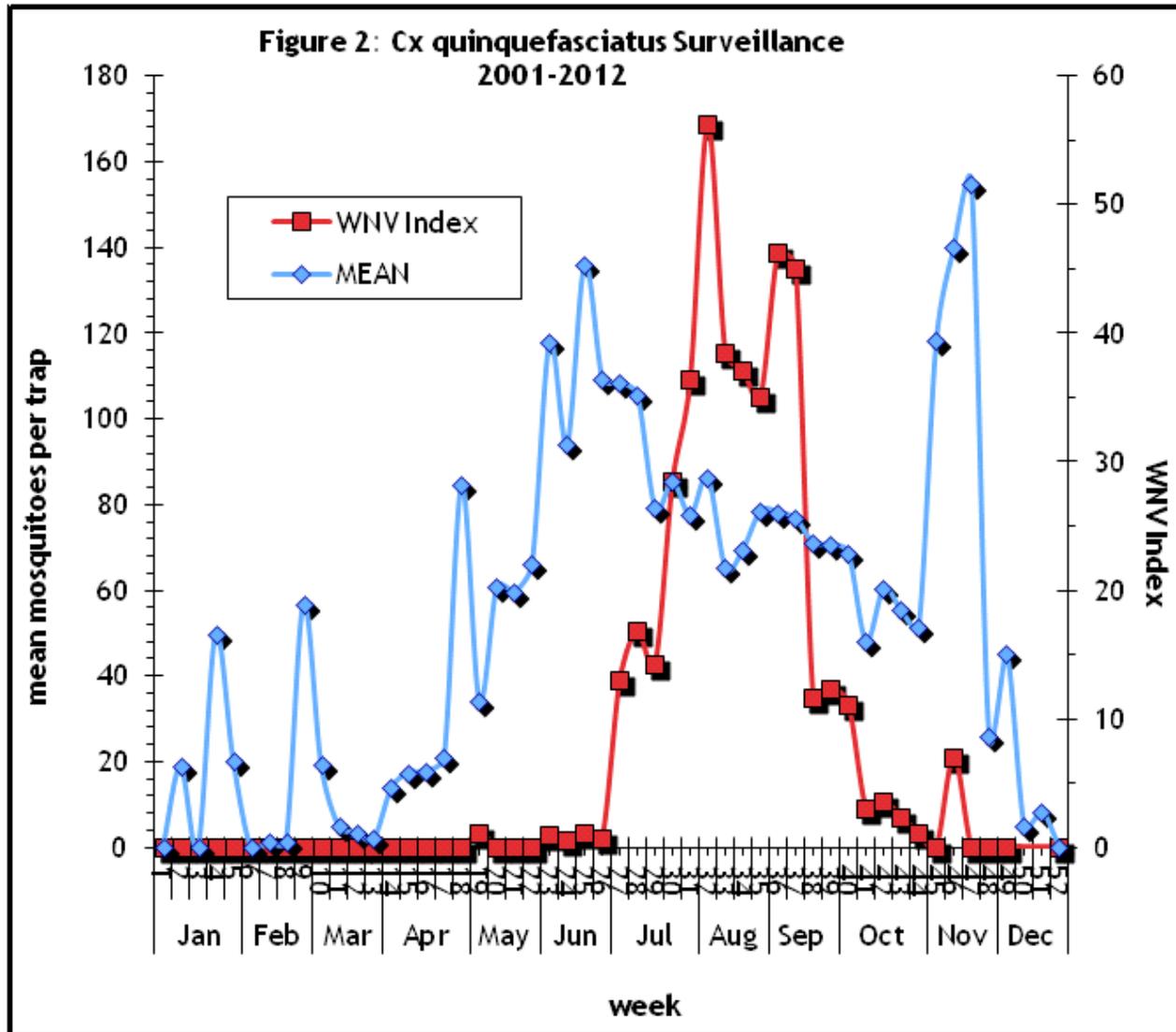
Virus	trap types			
	aspirator	CDC	Exit	Gravid
PENDING		7	1	9
NEG	1	1420	135	4169
POS-EEE		2	1	
POS-Flanders		2		58
POS-Flanders (variant)				2
POS-WNV		1		124



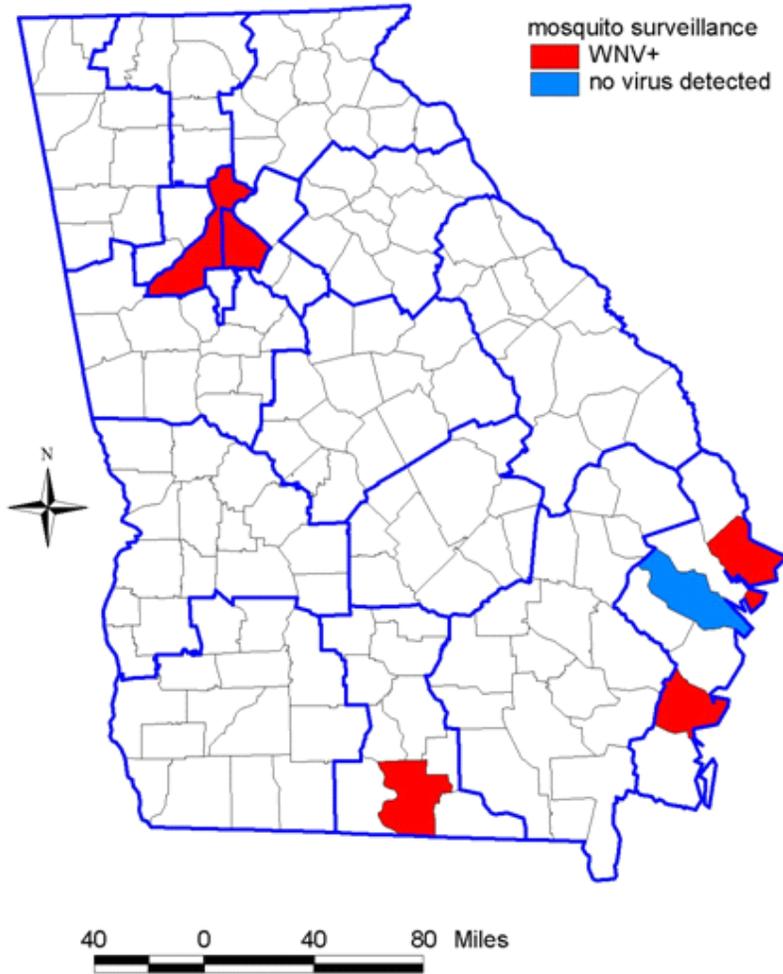
The Minimum Infection Rate or MIR = (# WNV+ Pools/Total # Mosquitoes Tested) X 1000. The WNV Index is the MIR multiplied by the number of mosquitoes per trap night. An MIR of 0 suggests that there is no viral activity in the area. An MIR of 0.1 to 3.9 indicates that some viral activity is present, and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



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Arboviral Surveillance, 2012



GA Arboviruses 2001-2012					
Virus	trap type				Total
	Unknown	CDC	Other	Gravid	
Cache Valley	6				6
EEE	1	12	1	4	18
Flanders	16	15		1005	1036
Flanders (variant)		1		30	31
HJV		5		3	8
HP				1	1
Keystone	2	1			3
LAC	1				1
Orbivirus			1		1
Potosi	2	3			5
South River virus	2				2
TENV		1			1
Unknown				1	1
WNV	227	20		1147	1394
Total	257	58	2	2191	2508

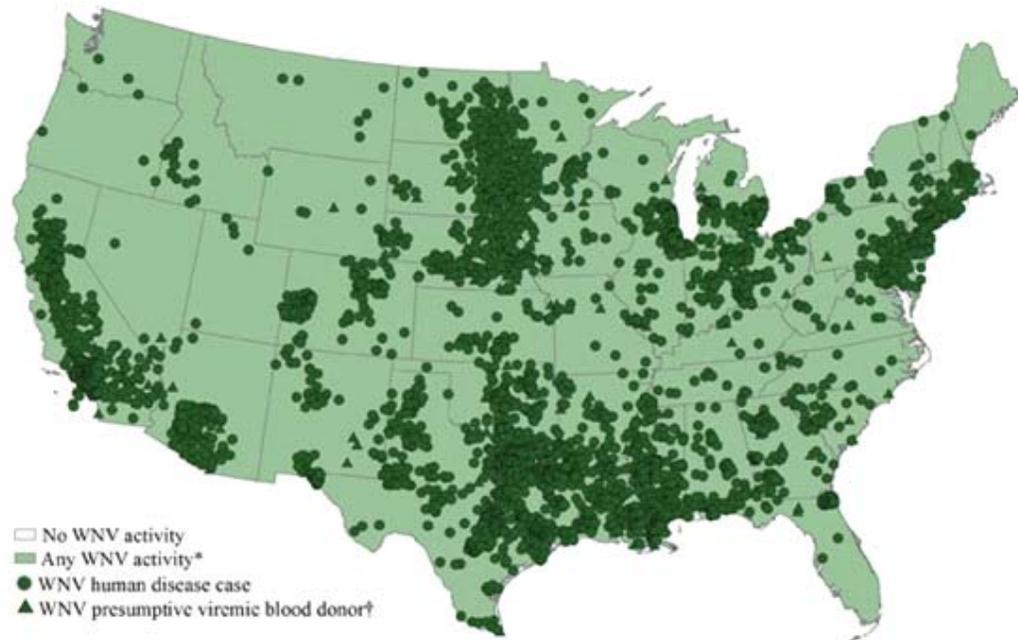
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WNV ACTIVITY MAP:

Non-human West Nile virus infections have been reported to CDC ArboNET from the following states:

Alabama, Arizona, Arkansas, California, Colorado, Connecticut, Delaware, Florida, Georgia, Idaho, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, Montana, Nebraska, Nevada, New Hampshire, New Jersey, New Mexico, New York, North Dakota, Ohio, Oklahoma, Oregon, Pennsylvania, Rhode Island, South Carolina, South Dakota, Tennessee, Texas, Utah, Vermont, Virginia, Washington, West Virginia, Wisconsin and Wyoming.

Five thousand eight hundred and ninety human West Nile virus infections have been reported to CDC ArboNET from Alabama, Arizona, Arkansas, California, Colorado, Connecticut, Delaware, District of Columbia, Florida, Georgia, Idaho, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, Montana, Nebraska, Nevada, New Hampshire, New Jersey, New Mexico, New York, North Carolina, North Dakota, Ohio, Oklahoma, Oregon, Pennsylvania, Rhode Island, South Carolina, South Dakota, Tennessee, Texas, Utah, Vermont, Virginia, Washington, West Virginia, Wisconsin, and Wyoming.



<http://www.cdc.gov/ncidod/dvbid/westnile/surv&control.htm>

West Nile virus (WNV) activity reported to ArboNET, by state, United States, 2012 (as of December 11, 2012)

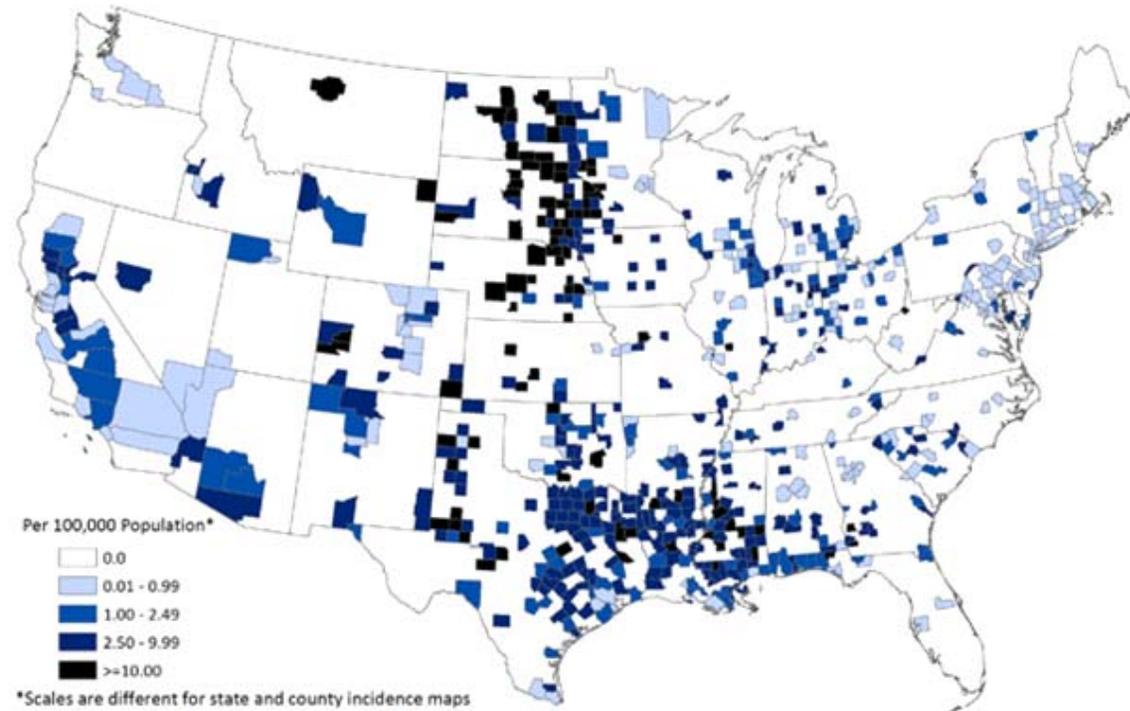
NEUROINVASIVE DISEASE MAP

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Of the 5387 WNV cases reported to the CDC, 2734 (51%) were reported as neuroinvasive disease cases and 2653 (49%) were reported as nonneuroinvasive disease cases. Five hundred and ninety seven (597)WNV presumptive viremic blood donors (PVDs) have been reported at this time.

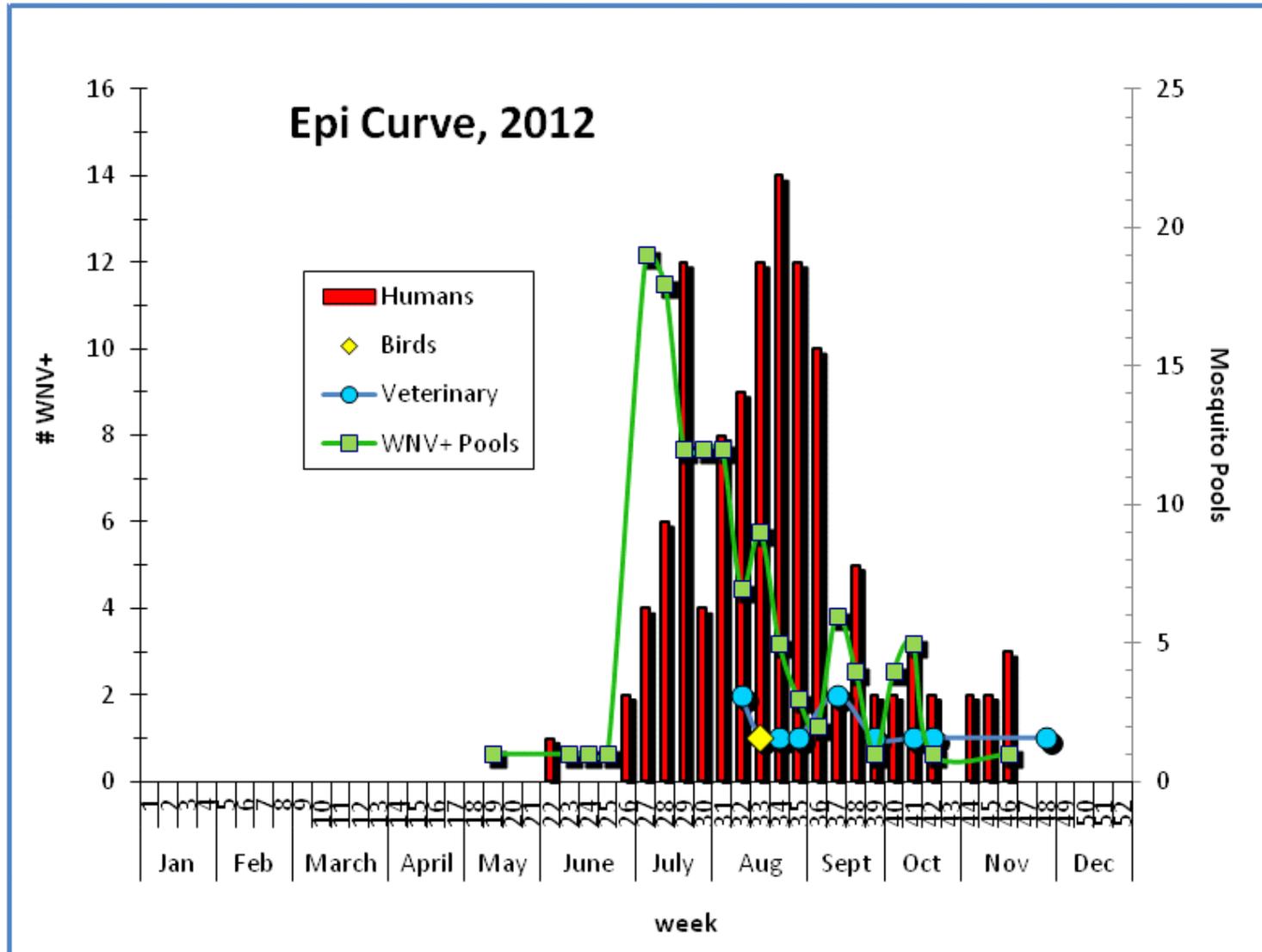
West Nile virus neuroinvasive disease incidence maps reflect surveillance reports released by state and local health departments to CDC's ArboNET system for public distribution. Map shows the incidence of human neuroinvasive disease (encephalitis, and/or meningitis, and/or acute flaccid paralysis) by county for 2012 with shading ranging from .01-.99, 1.0-2.49, 2.50-9.99, and greater than 10.0 per 100,000 population.

Neuroinvasive disease cases have been reported to CDC ArboNET from the following states: Alabama, Arizona, Arkansas, California, Colorado, Connecticut, Delaware, District of Columbia, Florida, Georgia, Idaho, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, Montana, Nebraska, Nevada, New Hampshire, New Jersey, New Mexico, New York, North Carolina, North Dakota, Ohio, Oklahoma, Pennsylvania, Rhode Island, South Carolina, South Dakota, Tennessee, Texas, Utah, Vermont, Virginia, Washington, West Virginia, Wisconsin, and Wyoming.



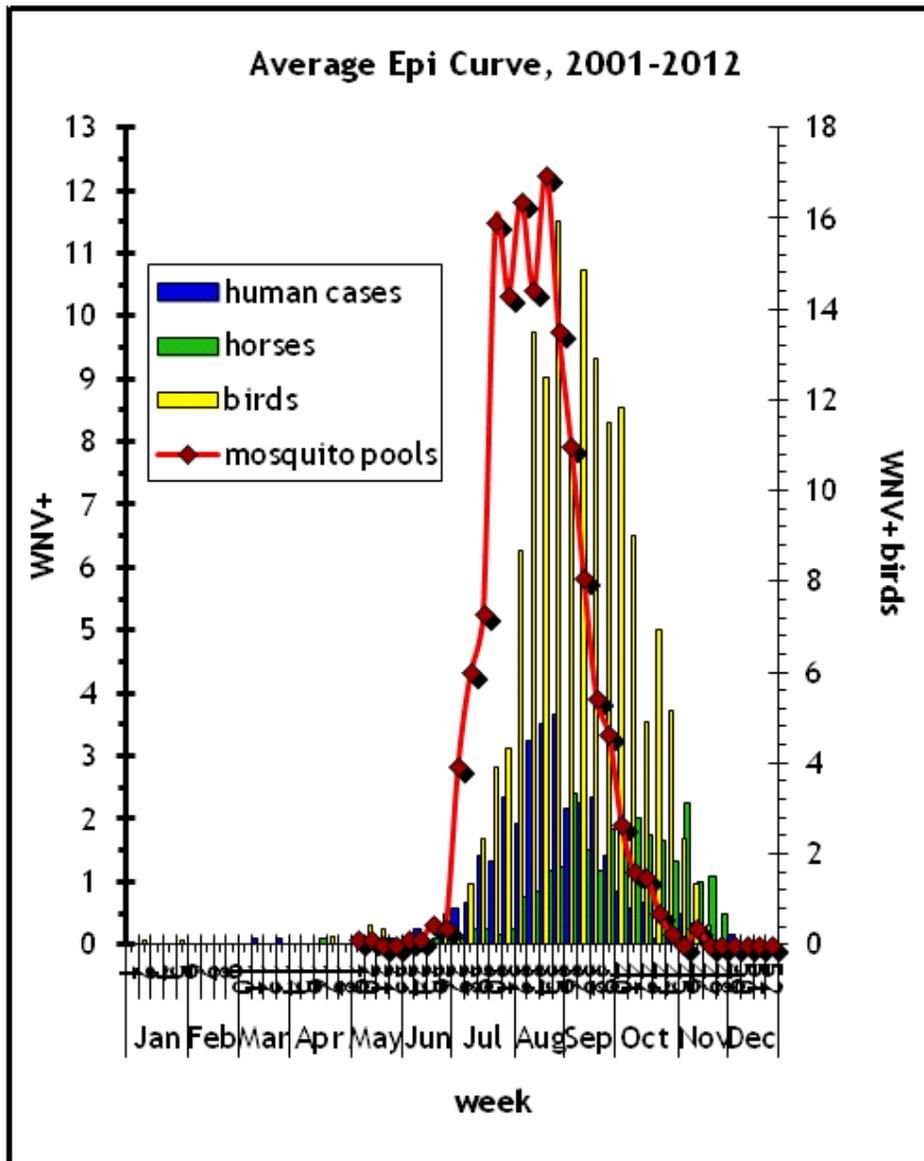
West Nile virus (WNV) Neuroinvasive Disease Incidence reported to ArboNET, by state, United States, 2012 (as of December 11, 2012)

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

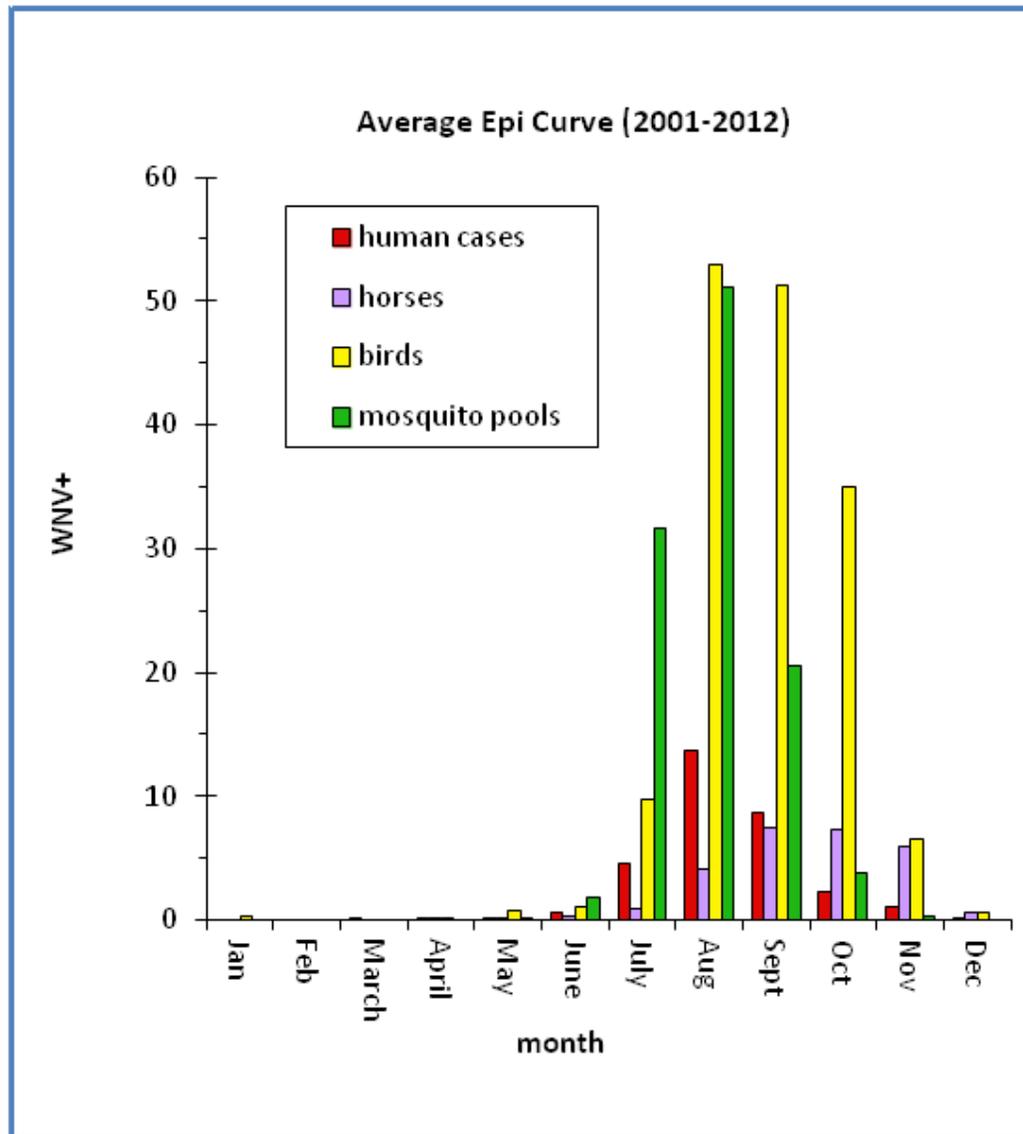
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Constructing epidemic curves is a common and very important practice in epidemiology. Epidemic curves are used to monitor disease occurrence, to detect outbreaks, to generate hypotheses about the cause of an outbreak, to monitor the impact of intervention efforts, and to predict the course of an epidemic.

2001-2012	human cases	veterinary case	mosquito pool	positive bird
total	393	1393	322	1896
mean	32.8	116.1	26.8	158.0

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

The GDPH Vector-Borne & Zoonotic Diseases Team

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Melissa Ivey, epidemiologist
Rosmarie Kelly, entomologist